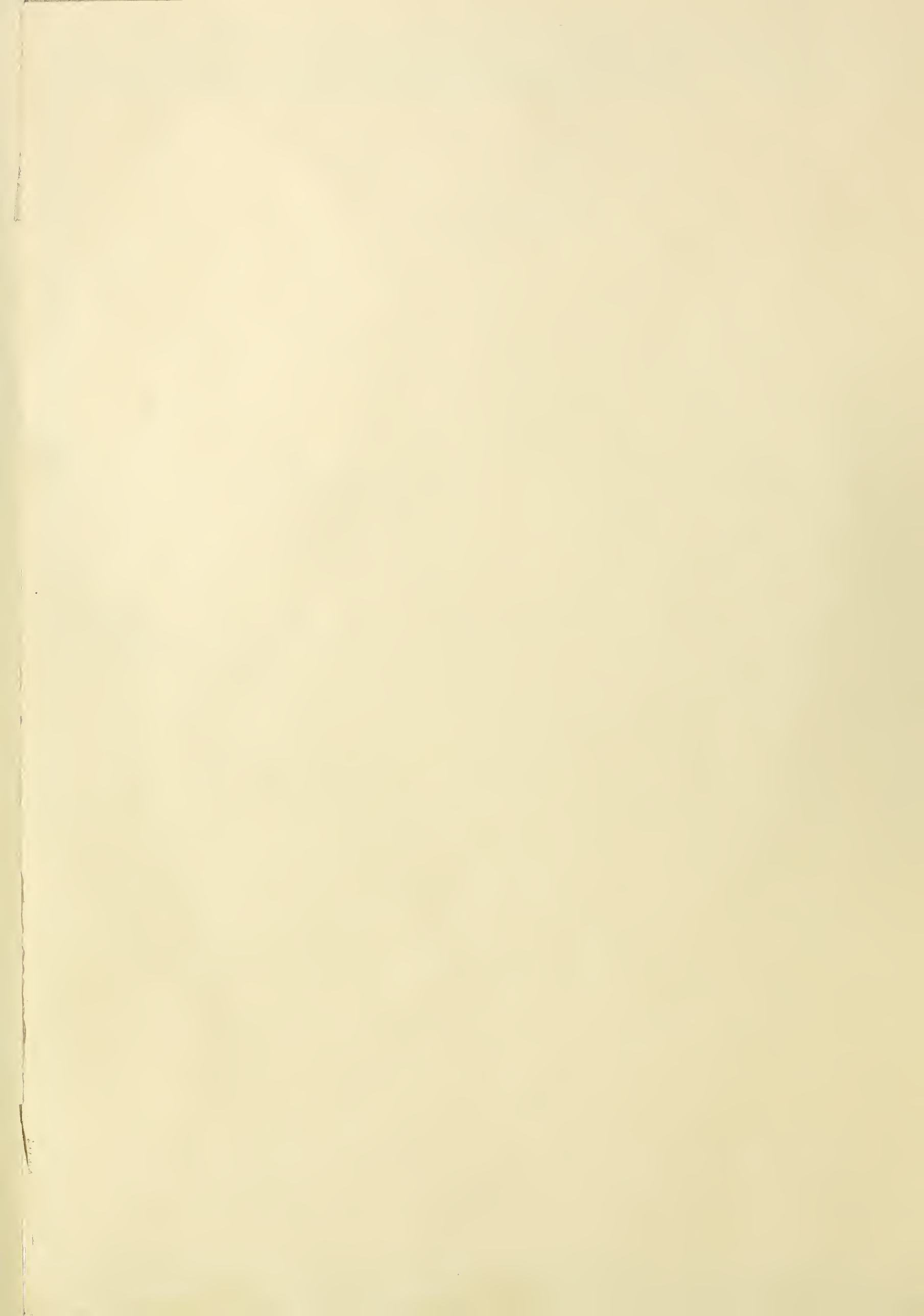


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# BETTER FRUIT

VOLUME XV

FEBRUARY

NUMBER 8

## ANNUAL SPRAYER

Editor of the Bureau of  
Animal Industry U. S.  
Dept. of Agric. Comp.



SPRAYING IS THE FRUIT GROWER'S INSURANCE

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Success in Spraying  
Spray Guns and Their Operation  
Pruning Young Peach Trees at Time of Planting

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Modern Methods of Codling Moth Control  
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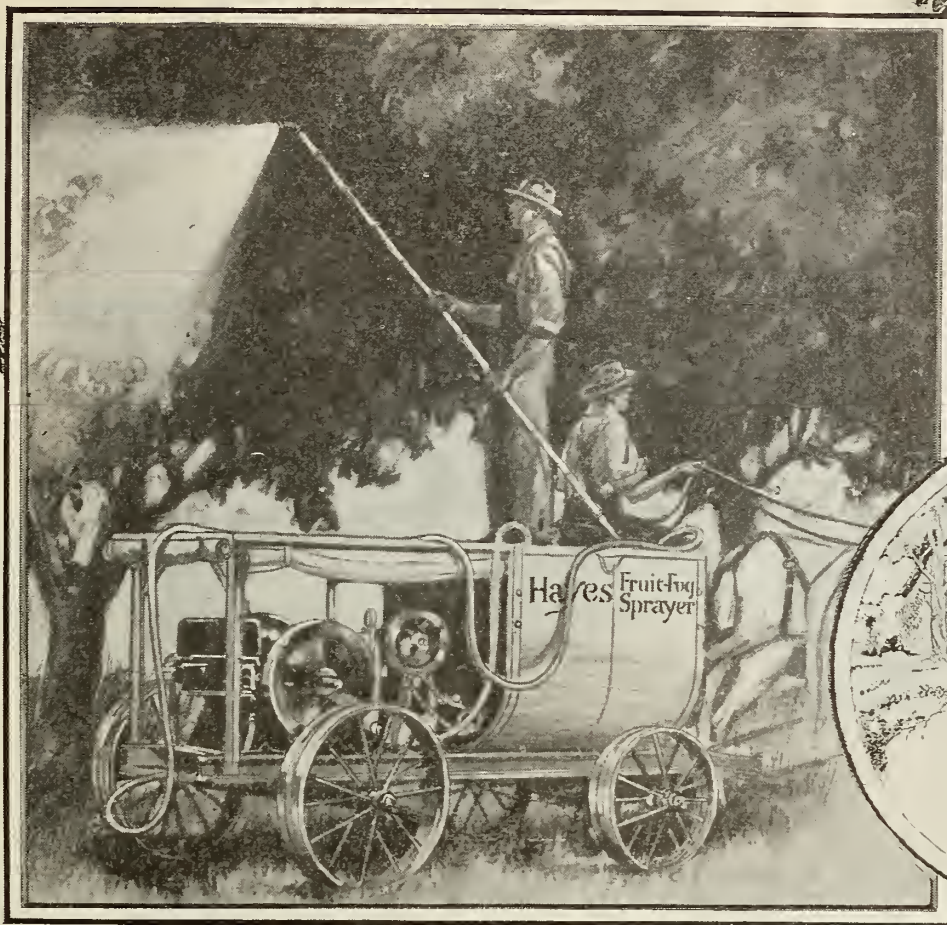
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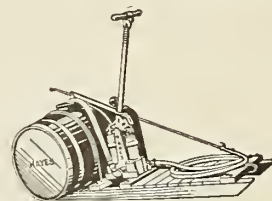
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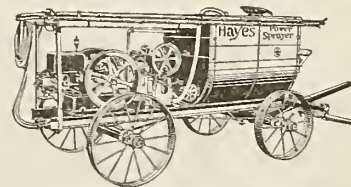
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Other uses .....

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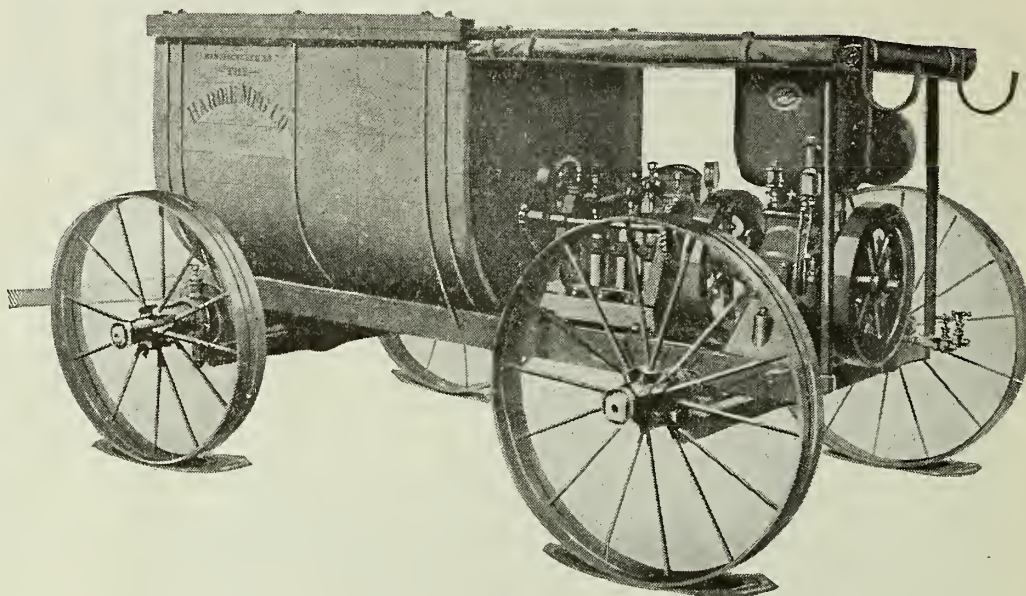
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NUMBER 8

## Success in Spraying

By H. P. Barss, Plant Pathologist, Oregon Agricultural Experiment Station

**S**PRAYING success and spraying failure are often not far apart. Neighboring orchards frequently illustrate this fact but that is not the point this article desires to bring out. Rather it is the intention to point out that the secret of success in spraying depends on attention to certain things which, although apparently minor details, are after all the big essentials upon which the difference between success and failure depend.

The Pacific Northwest is famous for the perfection of its apples and pears, but this perfection is won only through the attention of the fruit growers to the details of careful spraying. It is safe to say that successful spraying has reached its highest standards in this section of the country but this has come only after years of hard experience in the fight against pests and diseases, and years of scientific experimentation on methods of control. The high degree of freedom from blemishes now reached by the fruit in some of our most famous orchard sections is the direct result of the intelligent application of a well-established spray program. There are however, many new orchard sections and many orchards just coming into bearing whose owners have not yet mastered the essentials of successful control and the years ahead will be years of discouragement for them unless they learn the importance of attention to details in the battle against the enemies of the fruit crop.

### Spraying a Science.

Spraying is a science. That is, it has its foundation in a scientific knowledge of the pests and diseases to be controlled and of the way in which the spray materials in use affect these pests and diseases. One cannot be successful if one sprays "on general principles." Every single application has its particular reason for existence and the growers who spray successfully understand the whys, the whens and hows. It is not possible in a brief discussion like this to give a treatise on spraying but perhaps a few hints can be given that will help some to a better comprehension of the principles that underlie the spraying game.

### Prevention Not Cure.

In fighting orchard troubles cure is not possible. Once the infection has occurred or the insect has entered or attacked the fruit no spray will heal the injury. Every effort of the orchardist must be directed toward prevention. The method of prevention to be employed will depend on the nature of the pest and its life history and method of dissemination. There are some pests that are controlled by direct application like San Jose scale, aphids, or to some extent powdery mildew. Others are controlled by covering the tree or its foliage and fruit with a material which acts as a protective poison. Such sprays are used in combating codling moth, apple and pear scab, apple tree anthracnose, etc. The important thing here is to get a coating over every particle of surface so that the baby worm, for example, has only a poisoned surface to browse on, or the fungous spore no point of attack that is not covered by the death-dealing chemical. By spraying we place a poison barrier between the parasite and its natural feeding ground.

### Timeliness of Application Essential.

I once had a good friend who owned some apple trees but was not a commercial orchardist. He once complained that he was about to give up his attempts to spray for the control of scab. He had sprayed with the greatest thoroughness. He had used lime-sulphur. He had used it several times the common strength but without apparent results of any sort. I asked him when he had sprayed. He said, in March. Little wonder that he got no results! I told him briefly what the experienced orchard men know, that the disease spores arise from the old dead leaves on the ground but cannot attack dormant trees in winter and that no spray applied at that time could either kill the fungus on the ground or protect the foliage and fruit from attack when the spring came on. The next year he gave no dormant spray but just as soon as the cluster buds opened out and the small leaves separated far enough to expose the little cluster of undeveloped blossoms in the center he put on his first application to protect these parts as they unfolded against the air-borne scab spores. Just

before bloom, as the buds showed pink, he covered everything again to protect the leaves and flowers which had expanded much since the last application. Then, just as the petals dropped off, he sprayed everything again and repeated the work as required to protect newly developed foliage and fruit surfaces until the spring rains were past and the danger of further scab infection was practically over. This time he got his results and he knew the reason. Furthermore, I doubt whether he used much more concentrated lime-sulphur to make up all these applications than he had used the year before in the single useless spray. It was a knowledge of the way the disease worked and of how and when to protect the tree that meant success to him.

### Foliage Must Be Covered.

I have seen orchards of apples run about 60 per cent culls on account of scab just because the owners hoped to control the disease by spraying the fruit alone. They had applied the sprays for the fruit at the right intervals, but scab had been permitted to develop on the leaves and these infected leaves had produced so many myriads of spores that there were probably dozens of spores for every tiny bit of fruit surface not actually covered by the spray and wholesale infections on the fruit resulted.

### Tree Tops Often Neglected.

Many orchardists get a big surprise along toward late summer when the fruit begins to size and the weighted branches hang low. The early inspections showed little scab on the visible fruit but as the upper branches gradually sagged down and their load of apples came within range of the eye plenty of scab was in evidence. The reason was that the tops had been overlooked and undersprayed. One cannot expect satisfactory protection from scab or worms if the spray does not reach the tops as well as the lower portions of the trees. Many orchardists have not yet learned that their trees have reached a size where spraying from a tower is essential. It is admittedly difficult to know just how thoroughly one is covering the uppermost parts of a tree. There is one



great aid, however, of which the grower may make use. Its advantage is so great that a good many successful orchard men now employ it and more are adopting it every year.

#### Copperas (Iron Sulphate) Indicator.

This is the addition of copperas to the lime-sulphur spray which results in giving a black color to the solution. Without injuring the fungicidal value, this enables the spray operator to tell instantly exactly how well he is covering his tree and how fine the mist he is using. A half pound of copperas is taken for every gallon of concentrated liquid lime sulphur used in the tank or for every four pounds of dry lime sulphur put in. The required amount is dissolved in a little water and added to the tank. That is all. The foreman can check on the work of his crew without difficulty and the sprayer can see for himself.

#### Thoroughness All-important.

Spraying is not done for the chemical or medicinal effect on the tree. We use sprays that have as little effect on the tree as possible and as much effect on the pest. To be successful the spray must cover every susceptible surface completely. That is why high pressure and a fine mist spray are employed. In a finely divided condition the drops of spray are able to float like a mist through the tree and cover everything with tiny particles close together. With a coarse spray the large drops reach the fruit and foliage in big spatters leaving many good-sized unprotected spaces between which are open to attack. The recent introduction of the spray gun and high-powered engine have helped much to add to the speed of spraying and to the ease of operation but the successful use of the spray gun requires the development of considerable skill. The gun must be adjusted quickly from the broad cone mist for closer branches to the long drive for the upper reaches but with skillful handling the results are practically equal to those with the extension rod

and double angle nozzles. The gun, however, cannot be used with success on low-power or small-capacity outfits for the result is a coarse spray that does not permit of the thoroughness of application essential to good work.

#### Materials.

Success cannot be hoped for unless the right materials are used for the particular diseases and pests to be combated. There is no one spray that will do everything. Oil sprays, for instance, are valuable for certain insect pests but thus far have not proved useful for the control of fungous diseases. This fact should be remembered for in these days when much is being said about this class of spray materials growers are likely to be misled into expecting the impossible of them. For fungous diseases in general lime-sulphur is the proper material for spring sprays except on stone fruits where self-boiled lime-sulphur may be substituted. For autumn and winter protection Bordeaux is the most reliable material. New developments are taking place in the field of spray materials rapidly these days, but growers are wise who await the results of careful tests under conditions similar to their own before putting their trust in them. The Oregon Experiment Station and other experiment stations are performing this service of testing new sprays for the benefit of the fruit men and as soon as merit is demonstrated the facts are made known.

#### Particular Sprays for Particular Troubles.

Much time, labor and money have been in the past and still are wasted annually in sprays that do not get the results hoped for. This is particularly true of the so-called general clean-up spray given while the tree is dormant in the winter. The dormant spray has its uses. Peach leaf curl, for instance, cannot be controlled excepted by a dormant spray and this should be put on in most peach sections by the fore part of February if sure control is to be ob-

tained. For peach blight prevention however, a spray must be applied as soon as the crop is off or infections will come with the fall rains. Apple and pear scab can be controlled only by spring sprays. Apple tree anthracnose demands a spray which will protect against fall infections and sprays given at other times cannot be expected to bring results. Similar statements may be made in reference to insect pests. A dormant spray will kill San Jose scale, but there are many of our most troublesome pests that cannot be reached except during the growing season. Successful control depends on a knowledge of such facts.

#### Cumulative Effects.

One of the most notable results of consistent, thorough spraying is the gradual reduction in the severity of most pests and diseases. This has been strikingly demonstrated in the Hood River Valley where the general adoption of standardized spraying programs and thoroughness of application has very measurably reduced the prevalence of apple scab under climatic conditions exceedingly favorable for this disease. Similar cumulative effects may be looked for wherever over a period of years close attention is given to the details of the spraying game.

#### Spraying Economy.

Successful sprayers have found out that economy in spraying is measured in the degree of prevention secured, not in the amount of spray saved. Thoroughness is essential and as much spray must be used as will give the most perfect protection. For the commercial orchardist the cutting down on the number of sprays necessary or the saving of spray on the trees has only resulted in immeasurably greater losses in the final pack than the value of the spray and labor saved. Profit comes from thorough spraying at the right time and with the right materials. This is the secret of spraying success.

## Spray Guns and Their Operation

By T. J. Renner

MUCH has been said and written regarding the results obtained by using the spray gun, yet I have never seen a word written as to how to use one.

Mr. Black is very enthusiastic about the gun and reports excellent results. Mr. White says you could not hire him to use one in his orchard as they are no good. Why this difference of opinion? There are two reasons, either Mr. White did not have the same gun as Mr. Black or else he did not know how to operate it. Recently I met a man who was very emphatic about the gun being no good. I handed him another make of gun with a five-gallon disc in it and 260 pounds pressure on the sprayer behind it, and he soon changed his mind. Do not condemn all the guns because you could not get results with one. There are several makes of guns on the

market with large differences as far as results obtained and also as to ease of handling.

In regard to operating I will mention only the gun which has the largest sale and which when properly operated has given universal satisfaction. Pressure is the primary thing in getting results. The amount of pressure needed depends on the height of your trees; also as to whether the wind is blowing or not.

Numerous tests have been made at different pressures and it was found where the object to be sprayed does not exceed fifteen feet from the nozzle that 240 pounds gives you just as good a spray as 300 pounds does. In spraying greater distances than this 240 pounds does not break the spray fine enough to enter the calyx cups or to cover the largest amount of surface with a minimum amount of liquid. Therefore the

higher your trees are the more pressure is needed. The same is true when the wind is blowing and you have to stand farther from the tree in order to avoid the spray blowing back on you.

In small trees or on the lower branches of large trees it is only necessary to open the gun a trifle which is accomplished by turning the handle to the left. As the distance from the nozzle to the place to be sprayed increases, gradually turn the handle more. Five-eighths of a full turn gives you the extreme range and should you not be able to reach the desired spot then increase your pressure. Be sure not to open the gun any more than is necessary to reach the part you want to cover and close the gun as the distance decreases. This is important. If you have a gun which does not permit this

Continued on page 26.



# Pruning Young Peach Trees at Time of Planting

By C. L. Burkholder, Associate in Horticultural Extension, Purdue University

IT IS a common pruning practice to cut young peach trees to a whip 18 to 24 inches long at planting time. When the trees come from the nursery with green, spindling, poorly developed limbs at the point at which it is desired to start the head of the young tree, it is without doubt the best policy to cut to a whip. On the other hand if there is a nice head started at that point or even a little higher up it seems foolhardy to cut it off and grow on another at nearly the same place. Fig. 1 shows a young peach which has a fine set of scaffold limbs at about the right height when it came from the nursery. Three of these were selected for the head of the tree as shown in Fig. 2. These three limbs were cut back to stubs from three to four inches long.

Fig. 3 shows a tree which is best cut to a whip. The limbs are thin, green,

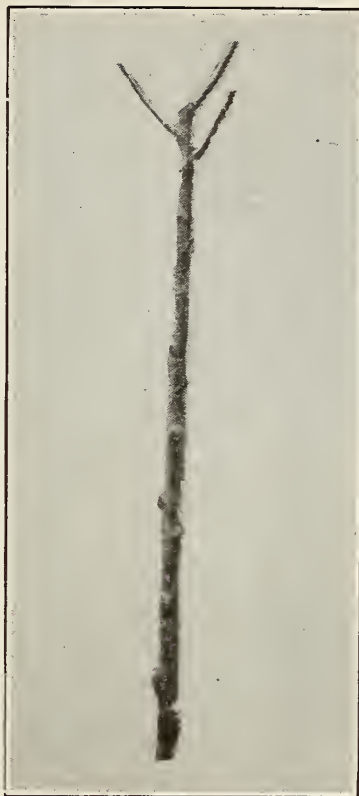


FIGURE 2. The tree in Figure 1 after pruning.

and sappy on the lower part of the tree where the scaffold should be started. When a peach tree is pruned to a whip at planting time, it often happens that three or four limbs start on one side of the tree, making a very poor head. In other cases the whip dies down nearly to the ground and sprouts up from near the bud. This risk is avoided when a scaffold can be picked from the limbs on the tree as it comes from the nursery.

Some very successful growers start the heads of their young trees six inches above the ground. This makes a low head and produces the largest number of branches 40 to 50 inches in length the first season but it does not seem to make a noticeably stronger scaffold. It is much more difficult to cultivate up close to a tree headed only six inches high than it is one headed 24 or 30 inches high. Many growers are training their trees higher than formerly as they are finding that they can keep the top of the tree plenty low and at the same time are able to disk up close to this type of tree.

It does not seem advisable to cut all peach whips to the same height at planting. It will be found on observation that there are very definite areas on the peach whip where the buds are much better developed. By cutting just above such an area of buds the chances are much greater that a satisfactory head will be formed the first season. Another factor having a bearing on the height at which peach whips should be cut is the diameter of the trunks. If small stocks, below  $\frac{5}{8}$  inch, they will make a more satisfactory growth the first year if cut back more severely than trees of the larger grades.

M. A. Blake of the New Jersey Ex-

perimental Station found that the most numerous buds on a peach whip were first 36 to 42 inches above the ground followed in order by the 42 to 48 and the 0 to 6 inch spaces. His conclusions were that peach trees at the time of planting should be pruned somewhat according to the grade and character of the stock and not according to some definite height regardless of all other factors.



FIGURE 3. A type of peach tree which should always be pruned to a whip.



FIGURE 1. A tree like this should not be cut to a whip. The scaffold limbs are already nicely started.

An exportable surplus of 100,000 boxes of apples in New Zealand is the estimate of the minister of agriculture of the dominion. With 37,000 acres of commercial orchards coming into bearing, new outlets will have to be found for the surplus.



# Orchard Spray Program for 1921

By H. P. Barss and A. L. Lovett

**T**HERE are two objects in spraying. One is to coat all parts of the tree or fruit so thoroughly that no fungus or insect can find any spot that is not protected by a layer of poison. The other is to destroy the pests or parasites present by hitting them with the proper kind of poison at a stage when they are defenseless against it. Spraying is a preventive. It cannot cure damage already done.

Spraying cannot be effective unless adapted to the life-habits of the parasite and the condition of the tree and fruit. Yet many growers apply sprays uselessly at times when little real good can be done and then fail to spray at the critical periods when they could get results. Other growers fail to do the work thoroughly enough to reach all insects, or to coat all susceptible parts of the tree. Still others use wrong materials. Success can be expected only from the thorough application of the right sprays at the right time.

## General Hints.

**Care of the Young Orchard:** If free from disease and insect pests when planted, young orchards seldom require any regular schedule of sprays. Thorough inspections should be made, however, at frequent intervals. All kinds of fruits should be watched for the invasion of San Jose scale or other scale insects, aphids, borers, bud weevils, fruit caterpillars and Armillaria root rot. In apple orchards look also for mildew, anthracnose, fire blight, and wooly aphis; in pears, for fire blight, slug, and blister mite; in peaches, for leaf curl, mildew, blight, and twig miner; in prunes and plums, for leaf spit, spider mite, bark beetles and borers; in cherries, for bacterial gummosis, leaf spot, slug, and shot-hole borer. When any of these troubles are found, follow out the recommendations outlined for them in the regular spray schedule.

**Pruning:** Pruning should be conducted in such a way as to let light and air into the interior of the tree. This favors rapid evaporation of moisture from leaf and fruit, and thus tends materially to hinder fungous infections. While pruning, inspect the trees for San Jose scale, wooly aphis, and other pests and diseases. Remove all mummied fruits from the orchard. Where bacterial gummosis or fire blight is present always sterilize pruning instruments and cuts with some good disinfectant to prevent spreading the disease.

**Spray Outfit and Nozzle:** An adequate outfit is necessary for best results. In power spraying a pressure of 175 to 225 pounds is advisable with rod and nozzle equipment. The angle nozzle of the disc type, using a disc with a small opening, gives general satisfaction. This delivers the fine, misty spray desired and affords ease of manipulation in applying the spray from different directions. Two of these noz-

zles on a Y at the end of a rod, by delivering more solution, increase the speed and thoroughness of application.

**Use a Tower:** In spraying larger trees satisfactory control of insects and diseases in the upper third of the trees is next to impossible without the use of a tower.

**Advantages of the Spray Gun:** The new "Spray Gun" type of nozzle has met with general favor. This is a very compact outfit, easy to manipulate and delivering a large quantity of liquid. Powerful pressure is essential for the proper functioning of a spray gun, a force of 250 to 300 pounds being advisable. Engine troubles commonly develop, with the use of the gun, from speeding up the engine where the power and capacity are insufficient to maintain a reserve when in action. The spray gun does its best work on the highest powered outfits. With such an outfit in the hands of a careful manipulator, spray may not only be applied practically as well as with the extension rods, but much more rapidly and with less fatigue.

**Lime-Sulphur Injury:** Lime-sulphur should not, as a rule, be applied after early June, in apple orchards, because of the burning that often results when hot, bright weather prevails. Self-boiled lime-sulphur is recommended as a substitute under conditions where ordinary lime-sulphur is liable to injure. Even as dilute as 1 to 45 lime-sulphur may cause injury in warm weather to prune fruit and foliage and it is unsafe to use on peach foliage at any time.

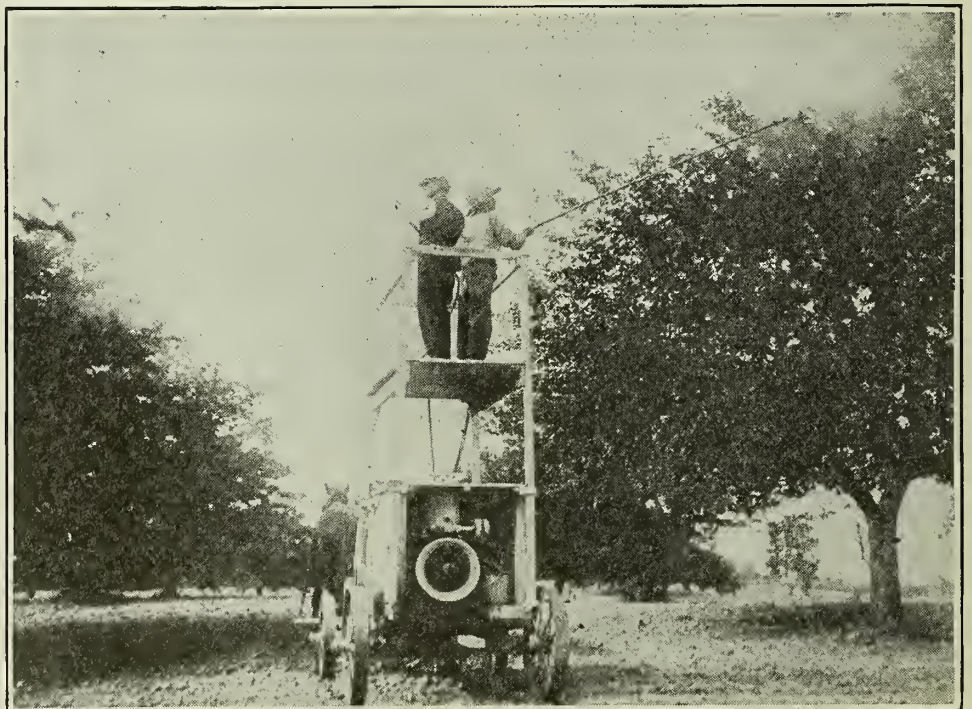
**Local Variations:** Climate has a tremendous influence on the severity of insect and fungous attack and on the time when the attacks occur. Hence the marked variations in climate from season to season and the difference in temperature, rainfall, etc., in different sections of the state will naturally

make some modifications in the time of application and number of sprays required to obtain best results. The recommendations in this article are adapted most closely to the average conditions prevailing in the large fruit growing areas from the Cascades west and from the Valley of the Umpqua north. To the east and south, where rainfall is less abundant, fungous diseases will, in general, be less severe and will require fewer fungicidal sprays for control. This favorable circumstance need not be true of insect pests and their control. Some fruit sections are so fortunate as to have the services of a trained specialist familiar with the diseases and insect pests and with local conditions. Growers so favored, should by all means obtain the available, consult the college.

## Pointers on Spray Materials.

Many varieties of commercial spray materials are on the market, some of them for general use, many of them for special purposes. Most of these materials are very good when properly used; some are of questionable value when price and purpose are considered, and a few are really dangerous. As a rule the commercial preparations of the various spray materials recommended in this article are standardized, are more convenient to use, and often as cheap as the home-made sprays when the labor and equipment necessary for home preparation are considered. It is important that the material, if a commercial product, be pure and fresh. It should be in the original unopened container and should not have been allowed to dry out or to freeze.

**Lime-Sulphur:** Wherever the word "lime-sulphur" is used in this article it refers to the ordinary commercial concentrated lime-sulphur solution, testing approximately 32 degrees Baumé. The



Applying Spray from Horse-Drawn Rig.





Applying the Spray from Gasoline-Propelled Truck.

expressions "lime-sulphur 1 to 8, 1 to 30," etc., mean one gallon of this commercial lime-sulphur added to 8 gallons or to 30 gallons of water, etc. When the lime-sulphur is made at home it should always be tested with a hydrometer, and dilutions made according to the tables which are printed herewith. It should be remembered, however, that thoroughness of application is always more important than minute exactness of dilution.

#### STANDARD LIME-SULPHUR DILUTION TABLE.

Showing in columns 1, 2, 3 and 4 the number of gallons of water required for each gallon of concentrated solution to obtain the desired strength.

Hydrometer Test of Stock Solution	Specific Gravity	1 Dormant Spray (1-8) Gallons	2 Early Spring Spray (1-30) Gallons	3 Mid Spring Spray (1-40) Gallons	4 Late Spring Spray (1-50) Gallons
34°	1.304	8 3/4	32	43	53 1/2
32°	1.282	8	30	40	50
30°	1.260	7 1/4	28	37	46
28°	1.239	6 1/2	25 1/2	34	42 1/2
26°	1.218	6	23 1/2	31	39
24°	1.198	5 1/4	21 1/2	28 1/2	35 1/2
22°	1.179	4 3/4	19 1/2	26	32
20°	1.160	4	17 1/2	23	28

#### SIMPLIFIED LIME-SULPHUR DILUTION TABLE.

To make 50 gallons of dilute spray use the quantity of concentrated lime-sulphur indicated in columns 1, 2, 3 and 4 for the different strengths, and dilute with water to 50 gallons.

Hydrometer Test of Stock Solution	Specific Gravity	1 Dormant Spray (1-8) Gallons	2 Early Spring Spray (1-30) Gallons	3 Mid Spring Spray (1-40) Gallons	4 Late Spring Spray (1-50) Gallons
34°	1.304	5	1 1/2	1	1 1/4
32°	1.282	5 1/2	1 1/2 *	1 *	1
30°	1.260	6	1 3/4	1 1/4	1 *
28°	1.239	6 1/2	1 3/4 *	1 1/4 *	1 1/4 †
26°	1.218	7	2	1 1/2	1 1/4
24°	1.198	8	2 1/4	1 3/4	1 1/2 †
22°	1.179	9	2 1/2	2 †	1 1/2
20°	1.160	10	2 3/4	2 *	1 3/4 †

\* Means use a little over measure.

† Means use scant measure.

**Dry Lime-Sulphur:** Several firms are now putting on the market preparations of lime-sulphur in dry form. These are convenient to use and appear not to be more injurious to foliage or fruit than the ordinary lime-sulphur. Unfortunately the experiment station has thus far been unable to make satisfactory comparative tests between these dry forms and the liquid material as far as control of diseases or insect pests is concerned. At present, therefore, no statement as to relative effectiveness can be made except that from analyses by the department of chemistry it appears that it will take about four pounds of the dry lime-sulphur to be equal in

fungicidal or insecticidal strength to one gallon of the average commercial liquid lime-sulphur.

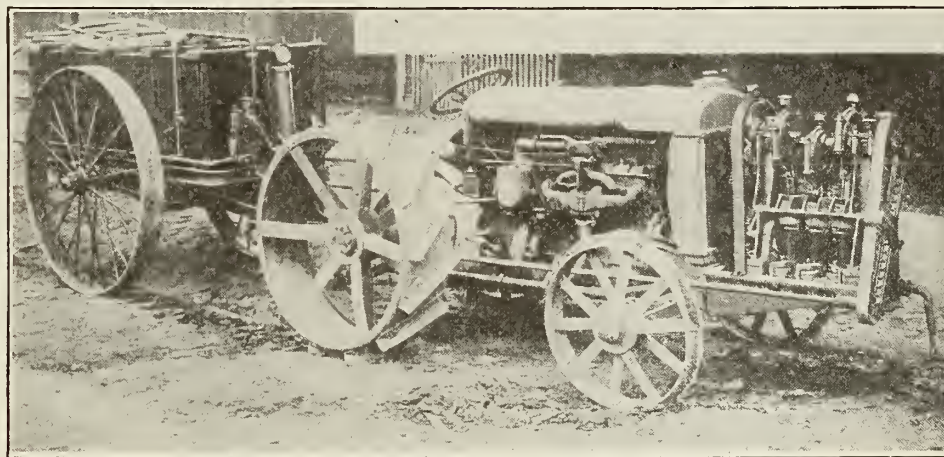
**An Aid to Thoroughness: Iron Sulphate (Copperas):** This material, dissolved in water and added to the spray tank at the rate of half a pound of iron sulphate to each gallon of concentrated lime-sulphur used, will turn the solution black without impairing its value. This black color is a valuable indicator for the man who is spraying, enabling him to determine exactly how well he is covering the tree.

**Arsenate of Lead:** Arsenate of lead is prepared in paste form and as a powder. Both are effective in the control of insects. Recent investigations indicate that unless one is near the

using the paste arsenate, double the amount here recommended.

Two types of lead arsenate occur, known respectively as the basic lead arsenate (neutral arsenate) or triplumbic, and the lead hydrogen arsenate (acid arsenate) or diplumbic. The neutral arsenate of lead is a more stable compound and is safer to use on tender foliage or in combination sprays where there is a tendency to burn. The acid arsenate has much to render it superior for most poison spray work and is considered safe in combination with lime-sulphur on apples and pears. Commercial lead arsenates are generally the acid forms unless otherwise branded.

**Arsenate of Lime:** Arsenate of lime or calcium arsenate has recently appeared as a commercial substitute for the lead arsenates. The value of this material lies in the reduced cost and higher poison content pound for pound. Methods for manufacturing the calcium arsenates have not, thus far, been standardized; brands therefore vary greatly in their chemical and physical properties. The calcium arsenates are less stable than the lead arsenate. This lack of stability increases the possibility of burn and makes necessary the addition of some material as a stabilizer. For this purpose, excess lime is generally added to the spray solutions. Summarizing our present knowledge of calcium arsenate as a commercial orchard spray, we may state that, with an excess of lime present in the solution, the material is safe and highly efficient as a spray. Probably there is, at present, no adequate reason for a wholesale

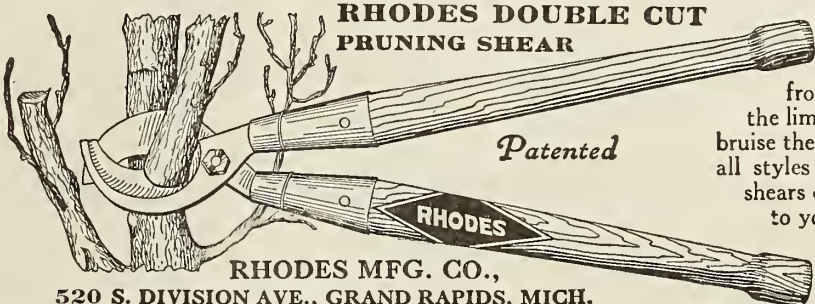


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place of manufacture, thus insuring that the paste be freshly made, the powdered arsenates are probably advisable. The proportions recommended in this article are figured on the basis of the powdered form. For example, "lead arsenate 3-200" means powdered lead arsenate three pounds to 200 gallons of the dilute spray solution. In

abandonment of lead arsenate in favor of calcium arsenate. Growers contemplating the use of calcium arsenate in the orchard are advised to submit samples to the Oregon Experiment Station for analysis and consequent instructions on the exact procedure in preparing the solution.

**Nicotine:** Nicotine as recommended



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in this article refers to the concentrated nicotine sulphate, 40 per cent solution. A strength of 1 to 1200, which is equal to one pint in 150 gallons, is sufficiently strong for most troubles; frequently higher dilutions are possible. Soap or lime-sulphur improves the spreading and killing powers of the nicotine solution.

**Oil Sprays:** The use of oil emulsions for the dormant spray has not been generally recommended or practiced in Oregon. For certain insect troubles they are superior to other sprays, and they are probably of equal value with lime-sulphur as a dormant insecticide for scale, red spider, mite, etc. Limited observations indicate that an occasional application of oil spray has a beneficial effect in softening and smoothing the bark and producing a generally stimulating effect on the tree. The action of an oil spray is comparatively slow and where rain follows within six or eight days after the application, the effectiveness is materially decreased. Particular care should be taken, therefore, to apply the oil during settled weather.

**Spreaders** are substances to be added to the spray solution which improve the effectiveness by increasing the wetting and covering powers of the spray as well as the adhesiveness, thus affording a greater protection for a longer time. It is our conviction that most of our standard sprays will be materially improved by the use of spreaders. Their use is particularly advised in the summer applications of arsenate for the codling moth.

**Unsafe Combinations:** The combinations recommended in this article are safe under ordinary conditions. Regarding combinations not referred to here, consult the Oregon Agricultural College.

#### The Dusting Method.

The possibility of applying fungicides and insecticides in a dust form has recently attracted much attention. The advantages are rapidity of application, the saving in labor, and the very light outfit required. There is also no water supply problem or need of hauling heavy loads of liquid. The cost of material is, however, much greater than for liquid sprays. A great disadvantage also seems to be that effective work is impossible where even a slight breeze is blowing. Furthermore, there have been found no dust materials effective for the control of scale, aphids, apple-tree anthracnose, peach-leaf curl, and some other troubles. Unless later developments overcome these disadvantages, therefore, the dusting outfit must be considered only as a supplement to the regular spray outfit, and not a practical substitution for it under Oregon conditions.

With very few exceptions, the regular spray program as recommended for the control of apple scale and codling moth should be followed in the bearing orchard. Frequent orchard inspections should be made, and where other pests and diseases are found, the proper applications for their control should be given.

#### SPRAY PROGRAM FOR APPLES AND PEARS

<i>Application</i>	<i>Time Applied</i>	<i>Pest or Disease and Materials to Use</i>
1. Dormant† Spray.	As the winter buds are swelling and before they open.	<i>For San Jose Scale, Red Spider Mite, Blister Mite:</i> (Pear) Use lime-sulphur 1-8 or miscible oil 1-17. <i>For Leaf Roller*:</i> Use miscible oil 1-17.
2. Delayed† Dormant Spray.	Pears: Cluster bud scales separating. Apples: Young leaves separated just enough to expose blossom buds.	<i>For Scab and Mildew*:</i> Use lime-sulphur 1-30. <i>For Aphids:</i> Add nicotine 1-1200. <i>For Bud Moth:</i> Add arsenate of lead 4-200.
3. Pink or Pre-blossom Spray.	When the blossom buds are well separated in the cluster, just before opening.	<i>For Scab and Mildew:</i> Lime-sulphur 1-40. <i>For Bud Moth, Leaf Roller, Pear Fruit Worm:</i> Add arsenate of lead 4-200.
4. Calyx Spray.	Just as the last petals are falling and before the calyx closes on main bud of each cluster.	<i>For Scab and Mildew:</i> Lime-sulphur 1-40. <i>For Codling Moth (apples only):</i> Add arsenate of lead 3-200.
5. Ten-day Spray.	Ten days or two weeks after the calyx application.	<i>For Scab and Mildew:</i> Use lime-sulphur 1-40 or 1-50 (or self-boiled lime-sulphur 8-8-50, if burning is feared). <i>For Pear Slug:</i> Add lead arsenate 3-200.
6. Thirty-day Spray.	Four or five weeks after the calyx application.	<i>For Scab and Mildew*:</i> Use lime-sulphur 1-50 (or self-boiled lime-sulphur 8-8-50, to prevent burning). <i>For Codling Moth*:</i> Add arsenate of lead 3-200. <i>For Green and Woolly Aphids:</i> Use nicotine 1-1200.
7. July Spray.	July 10 to 25, depending on locality and season.	<i>For Codling Moth* (second generation):</i> Use arsenate of lead 3-200.
8. August Spray.	August 5 to September 5, depending on locality and season.	<i>For Codling Moth*:</i> Use arsenate of lead 4.5-200. <i>For Anthracnose:</i> Add Bordeaux mixture 4-4-50.
9. Fall Spray.	Late October, or immediately after fruit is picked.	<i>For Anthracnose:</i> Use Bordeaux 6-6-50, or lime-sulphur 1-8. <i>For Pear Leaf Blister Mite* and Scale:</i> Use lime-sulphur 1-8.

#### SPRAY PROGRAM FOR PRUNES AND PLUMS

1. Dormant Spray.	Just as the winter buds are opening.	<i>For San Jose Scale, Red Spider Mites, Twig Miner:</i> Use lime-sulphur 1-8.
2. Pre-blossom Spray.	When the blossom buds are showing white, just before opening.	<i>For Brown Rot* Blossom Blight:</i> Use Bordeaux 4-4-50, or lime-sulphur 1-30. <i>For Bud Moth:</i> Add lead arsenate 2-100. <i>For Aphids:</i> Add nicotine 1-1200.
3. First Fruit Spray.	As soon as the "shucks" or calyx parts are off the fruit.	<i>For Brown Rot and Leaf Spot*:</i> Use Bordeaux 4-4-50, or self-boiled lime-sulphur 8-8-50, with spreader. <i>For Syneta:</i> Add neutral or triplumbic lead arsenate paste 7-100.
4. June Spray.	About June 1.	<i>For Leaf Spot (beneficial for Brown Rot also):</i> Use Bordeaux 4-4-50, or self-boiled lime-sulphur 8-8-50, with spreader.
5. July Spray.	About July 1.	<i>For Leaf Spot (beneficial for Brown Rot also):</i> Use same materials as in preceding.
6. August Spray.	About one month before picking time.	<i>For Brown Rot*:</i> Use Bordeaux 4-4-50, or self-boiled lime-sulphur 8-8-50; add spreader.

#### SPRAY PROGRAM FOR PEACHES

1. Leaf Curl Spray.	From December to mid-February.	<i>For Peach Leaf Curl*:</i> Use Bordeaux 6-6-50.
2. Late Dormant Spray.	Just as the first buds are ready to open.	<i>For Peach Twig Miner, San Jose Scale, Red Spider Mite:</i> Use lime-sulphur 1-8. (If scale is absent dilute 1-12.) <i>For Aphids:</i> Add nicotine 1-1200. <i>For Bud Moth:</i> Add lead arsenate 2-100.
3. First Fruit Spray.	Just after the "shucks" or calyx parts fall off.	<i>For Peach Blight* on fruit and leaves:</i> Use self-boiled lime-sulphur 8-8-50. (Many growers use Bordeaux 4-4-50 with good results.)
4. Second Fruit Spray.	About two or three weeks after the preceding.	<i>For Peach Blight on fruit and leaves:</i> Use self-boiled lime-sulphur 8-8-50.
5. Last Fruit Spray.	About one month before picking.	<i>For Brown Rot:</i> Use self-boiled lime-sulphur 8-8-50. <i>For Bud Moth and Peach Twig Miner:</i> Add lead arsenate 2-100.
6. Early Fall Spray.	As soon as the fruit is picked.	<i>For Peach Blight, twig and bud infections:</i> Use Bordeaux 4-4-50.
7. Late Fall Spray.	About the first of November.	<i>For Peach Blight, twig and bud infections:</i> Use Bordeaux 6-6-50.

#### SPRAY PROGRAM FOR CHERRIES

1. Dormant Spray.	Just as the winter buds are beginning to open.	<i>For San Jose Scale and Red Spider Mite:</i> Use lime-sulphur 1-8. <i>For Aphids:</i> Add nicotine 1-1200 and apply Tanglefoot in band around trunk to prevent ants carrying aphids up the tree.
2. Pre-blossom Spray.	When blossom buds show white, just before they open.	<i>For Brown Rot Blossom Blight*:</i> Use Bordeaux 4-4-50, or lime-sulphur 1-30, with spreader. <i>For Bud Moth and Syneta:</i> Add neutral or triplumbic lead arsenate paste 7-100.
3. First Fruit Spray.	As soon as most of the "shucks" or calyx parts have fallen.	<i>For Leaf Spot* and Brown Rot:</i> Use Bordeaux 4-4-50, or lime-sulphur 1-50, or self-boiled lime-sulphur 8-8-50. <i>For Syneta:</i> Add neutral or triplumbic lead arsenate paste 7-100.
4. Second Fruit Spray.	Apply a month before picking time.	<i>For Brown Rot and Leaf Spot:</i> Use Bordeaux 4-4-50, or self-boiled lime-sulphur 8-8-50. <i>For Slug:</i> Add neutral or triplumbic lead arsenate paste 7-100.
5. July Spray.	After the fruit is picked or about first of July.	<i>For Leaf Spot:</i> Use Bordeaux 4-4-50, or self-boiled lime-sulphur 8-8-50.
6. August Spray.	About the first week in August.	<i>For Cherry Slug and Bud Moth:</i> Use lead arsenate 2-100.

\* When a pest or disease is marked with a star (\*) see special discussions regarding it.

† Spraying for San Jose scale and red spiders may be deferred until the Delayed Dormant (No. 2) if the strength of lime-sulphur in No. 2 is increased to 1-3.



### Diseases of Apples and Pears.

**Apple Scab:** Dormant sprays are of no value against scab. In Western Oregon with the more susceptible varieties the delayed dormant spray (No. 2) must be given as the first scab spray to prevent early infections. At least four scab sprays are required to insure a clean crop where rains continue into June.

Lime-sulphur will burn through scab spots which are already present on the leaves, and not infrequently also will cause a slight edging and tip burn of healthy leaves; but this is unavoidable. Periods of hot weather, however, are conducive to fruit burn and to more severe foliage injury. At such times the use of self-boiled lime-sulphur is suggested.

**Pear Scab:** This disease, which is similar to apple scab, is controlled in the same way. At least two thorough sprays before blossoming must be given to catch early infections. Some varieties, however, are extremely susceptible to lime-sulphur injury and very weak dilutions of this material are suggested. In fact, on the sorts most liable to spray injury, the use of self-boiled lime-sulphur beginning with the calyx spray would be advisable. The addition of a spreader to this material will greatly increase its covering power.

**Fire Blight:** While scab may destroy an entire crop, fire blight may destroy the entire orchard. It is the most dangerous of all known diseases of the apple and pear, and must be watched for unceasingly.

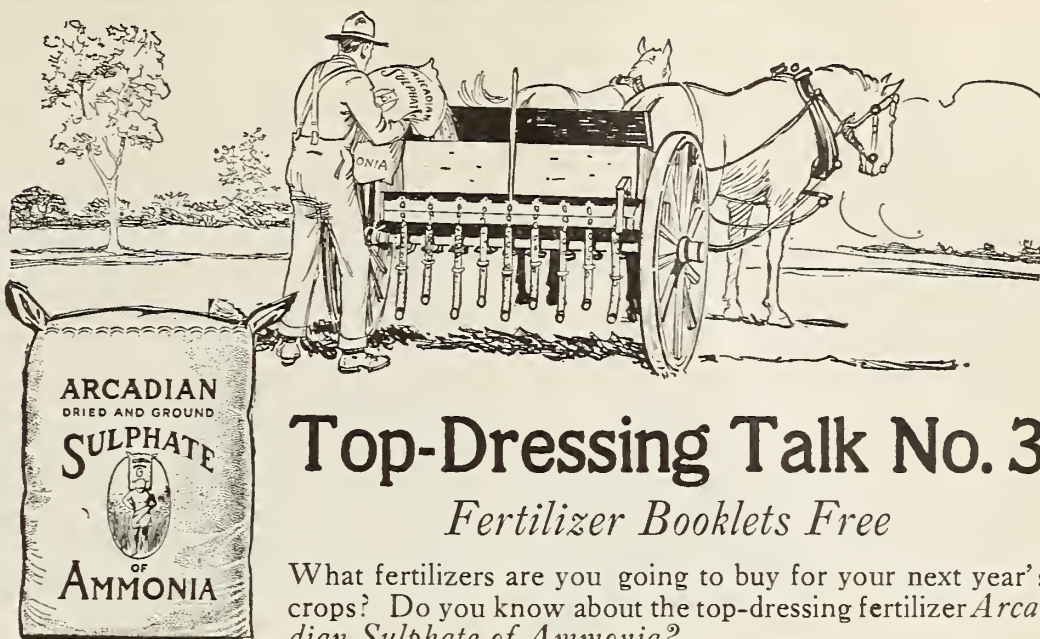
In cases of suspected fire blight, send specimens at once to the Agricultural Experiment Station at Corvallis for microscopic examination, and get in touch with your county fruit inspector or Farm Bureau agent. Do not attempt to cut out blight until you have received careful directions from a reliable source. It is highly contagious and may easily be spread by persons who do not understand the disinfecting process.

Do not be duped into using so-called blight cures. Many orchards have been ruined because owners have unwisely put their trust in some reputed "expert" or in some alleged "remedy" backed up by fine testimonials.

**Apple Tree Anthracnose:** Infections on fruit and branches start in the fall during the rainy spells. To clean up a badly attacked orchard an application of weak Bordeaux mixture should be given in August or early September, followed by winter strength Bordeaux immediately after picking time. When well under control, a single thorough spraying just after picking season will often be sufficient to keep the disease within bounds.

**Powdery Mildew of Apples:** Prune out all affected tips before spring. The ordinary sprays for the control of scab when given according to schedule will keep the mildew down to a practically negligible amount. The special iron sulphide mixture formerly advised is probably not of great advantage under Oregon conditions.

**Moss:** Moss is rarely troublesome where a regular spray schedule is main-



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tained in the orchard. To clean up an old moss-covered orchard add common soda lye to the dormant spray or spray straight lye dissolved in water at the rate of one pound to five or six gallons. Such strong caustic, however, should be used with caution. Bordeaux mixture and winter strength lime-sulphur are also of value.

Drouth Spot, Cork and Bitter Pit or Baldwin Spot of Apples: These are physiological troubles not caused by parasite organisms and hence not controllable by spraying.

#### Diseases of Stone Fruits.

Brown Rot of Stone Fruits: This is the worst disease of prunes in Oregon, frequently destructive to cherries, and sometimes bad on peaches. It varies tremendously in severity from year to year. It often causes considerable damage in prunes and cherries by blossom

blight. Attacks of fruit rot are likely to develop at any time during the season when there is continued moisture, particularly when accompanied by warm temperatures. A rigid spray schedule, therefore, cannot be adhered to. The worst attacks occur almost always during the ripening and picking period. Hence it is usually very desirable to give a thorough spraying about a month before picking. Other sprays should be given when conditions seem to justify them.

Leaf Spot or Yellow-Leaf Disease of Prunes and Cherries: Caused by a fungus known in its summer stage as *Cylindrosporium*. Results in dropping of leaves. This, if severe, brings about poor fruit development, retarded growth, and reduced or weakened fruit buds. Spraying will materially lessen the disease. Attacks vary greatly in severity from year to year. Hence growers are ad-

vised to watch and spray when first signs of the disease are evident.

Internal Browning and Gum Spot of Prune Fruit: These are physiological troubles and not controlled by sprays. Often mistaken for brown rot and insect attack.

Peach Blight: Infections take place abundantly during fall rains and cause the death of buds and the girdling of twigs during the winter. Then in the spring new infections attack fruit and foliage, causing fruit spot and leaf shot-hole. The first fall spray should be given before rains begin.

Peach Leaf Curl: Infections take place just as the leaves are emerging. The one spray needed must be applied before any of the leaf tips are out. Every bud and twig must be thoroughly covered. Leaf curl may be controlled by a winter application even as early as the first of December. Bordeaux gives more uniform success than lime-sulphur in controlling the disease.

Powdery Mildew of Peaches: The first control applications should be given soon after the winter buds have come out and while the leaves are still very small; repeat at intervals of three or four weeks until mildew is eliminated and give another spray if it begins to show again. Use self-boiled lime-sulphur 8-8-50 with spreader added. In warm weather dusting with very finely powdered dusting sulphur should be effective.

Bacterial Gummosis: This disease is common and destructive on young sweet cherries, and sometimes troublesome on other stone fruits in Western Oregon, but is apparently unknown east of the Cascades. It cannot be controlled by spraying.


#### Insect Pests.

San Jose Scale: This manifests itself as small, ash-gray or blackish, pimple-like scales clustered on the bark. Removing scale discloses a flattened, oily, lemon-yellow insect beneath. The bark is thin, and stained with purple, the trees becoming bark-bound and devitalized. Infested fruit shows bright red spots.

The ideal time to spray is during February. To avoid an extra application, may be put on earlier, or deferred to the delayed dormant. Use lime-sulphur 1-8. Application for control is advisable only when one is reasonably sure of presence of pest. Thoroughness is essential; drive the spray under the buds. Oil emulsions are effective, and are probably occasionally advisable as a substitute for lime-sulphur because of their beneficial effect on the tree.

Red Spider Mites: Use Spray No. 1 (or No. 2 on apple, pear and peach). Application is advisable only when one is reasonably sure of presence of pest.

Codling Moth: Use Sprays No. 4, 6, 7, and 8. The exact date for the application of Sprays No. 6, 7, and 8 will vary with the season and with the locality. In the case of No. 6 the date of application should correspond with the first deposition of eggs. Procure a standard thermometer and take daily readings at 8:00 p. m. during the season immediately following the calyx application.




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When the evening temperature registers 60 degrees or above, it is time to apply this spray. As a general rule, this date will follow the calyx spray by about three and one-half to four and one-half weeks in Eastern and Southern Oregon; four to five weeks in the Hood River Valley, and five to six weeks in the Willamette Valley. In a bearing orchard, it is never advisable to omit this spray.

Generally speaking, our most serious codling moth injury occurs in late summer resulting in the costly "September stinging." To assist in minimizing this injury it seems advisable to increase the poison dosage by one-half in the last summer application, using 4.5-200 in spray 8. The element of time of application is of first importance and will vary greatly with the season, locality, and local conditions. Where possible, if in doubt, consult the fruit inspector, county agent, or some official who is in a position to know when to apply these summer sprays. In Southern Oregon the rule is, "Keep the fruit covered with spray."

**Aphids or Plant Lice:** Nicotine sulphate, 40 per cent, added to Spray No. 2, at the rate of two-thirds pint to 100 gallons of the dilute spray, is the standard application for control of plant lice. As aphids are nearly always present in the orchard, this application is generally advisable. Reinfestation of apples may take place in June, in which case, add nicotine to Spray No. 6. In the case of cherry trees ants carry aphids up to reinfest the trees. Band the trees with Tanglefoot or other material to prevent this.

**Bud Moth:** This is a chocolate-brown worm one-third inch long, found in a mass of webbed leaves at tip of twig. On apple and pear add lead arsenate 4-200 to Sprays No. 2 and 3. On stone

fruits add neutral lead arsenate 7-100 to Spray No. 2. Application is advisable only where pest has done injury the past season.

**Pear and Cherry Slugs:** These are greenish-brown, slimy, slug-like larvæ, which skeletonize foliage of cherry and pear. On pear use Spray No. 5, adding lead arsenate 4-200. On cherry use Spray No. 4, adding neutral arsenate of lead, 6-100. Road dust, air-slaked lime, sulphur, or any finely divided powder applied as a dust is also very effective.

**Blister Mite:** This is usually serious only on pears. Use Spray No. 1, and be very thorough in applying it. The sprayed trees should appear as if white-washed. The ideal control for blister mite is a spray applied in the fall (see Spray No. 9). When thoroughly done, one application in three years is generally sufficient for satisfactory control.

**Leaf Rollers (on apple):** Most common in Northern and Eastern Oregon. Use miscible oil emulsion recommended in Spray No. 1. For maximum efficiency, apply during period of settled weather. Application is advisable only where one is reasonably sure of presence of pest.

**Fruit Worms (on pear):** Serious in Valley. Use Spray No. 3. Lead arsenate in the pink.

**Woolly Apple Aphis:** This pest occurs as clumps or masses of cotton-like patches about wounds, cracks, and galled areas of bark, or on water sprouts and exposed rootlets. Beneath this cottony mass are wriggling colonies of soft brown aphids. When thoroughly established, this is a very serious pest in apple trees. Mark infested trees for special treatment.

**Borers:** They are not controlled by sprays, but require special treatment.

**Fruit Tree Leaf Syneta:** This is a small, elongate, active, creamy-white beetle. Feeds on buds, unfolding leaves, blossom petals, and developing fruit, making unsightly holes. Use the neutral arsenate of lead, 7-100, in sprays as indicated.

**Cherry Fruit Maggot:** This is a small, white cylindrical maggot found feeding inside the fruit. If lead arsenate sprays are applied for the control of cherry slug, they will also ordinarily control the maggot. If it is desired to apply a special spray, use lead arsenate, 3-50, plus 2 gallons of cheap syrup. This should be applied at the rate of one pint to the tree. Use a hand pump throwing a fine misty spray which will deposit minute droplets on the outer leaves. This is to poison the fly which produces the maggot. Treat the trees just as the fruit begins to color well.

**Peach and Prune Twig Miner:** A common and serious pest of prune and peach. Occurs as a chocolate-brown worm one-quarter inch in length found in tunnels at the base of a wilted tip or fruit spur. Worms also tunnel into young fruit, causing it to drop. Summer applications are ineffective. Use

spray indicated. Applications are generally advisable as the pest is usually present.

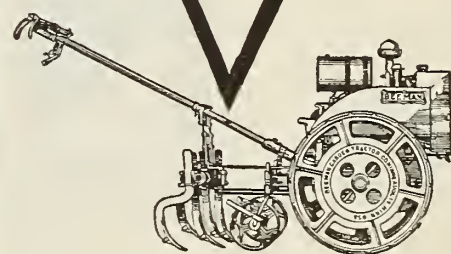
More complete information on particular pests and diseases, and also directions for making any particular spray material, may be secured by writing to the Oregon Agricultural College at Corvallis. If information is desired regarding the identity of any insect or disease, send complete description, together with specimens of disease and of the affected plants, if possible. Wrap the material in a container which will not be crushed in the mails. Put your name and address on the package.

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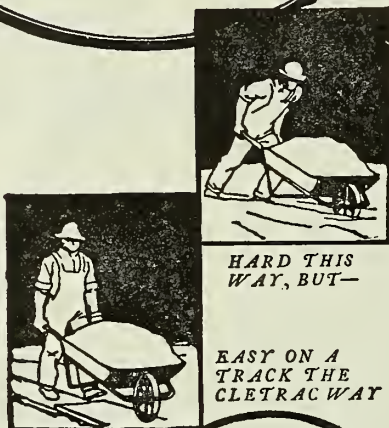
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Belt Pulley: Diameter, 8 inches; face, 6 inches.



# "Pedigreed" Trees—Where Do We Stand?

By A. E. Murneek, Assistant Professor of Horticultural Research, Oregon Experiment Station

**W**HILE we have been fast eliminating the scrub or unproductive cow from our dairy herds, and in its place have been introducing the selected or pedigreed animal, very little, if any, selection work of systematic and organized nature has been done with our fruit trees, the exclusive mortgage lifters of many a farmer of the Northwest. If there is a marked difference in respect to productivity among the Holsteins; if a Jersey is not always a Jersey; if "blood" counts; can there not possibly be also as real fundamental and tangible difference between two Newtown trees, though the buds from which they were propagated may have come from the same orchard. If "blood" counts in the Jersey, may it not count in the Spitzenburg as well? This analogy may not be permissible exactly, but it conveys the meaning just the same.

Undoubtedly there have been numerous, though largely spurious, attempts at selection of fruit trees. Most of them have, however, not justified the measures of precaution and necessary expenditure connected with such a practice. Perhaps the lack of a ready and convenient method of judging the exact commercial value of a selected tree—a "Babcock tester" for plants, so to speak—has been the main cause of these failures. Yet the waves of enthusiasm for "pedigreed" trees visit us

often enough. They are within the easy memory of the horticulturist of today. Just now one such wave is reaching us from our sister state in the south.

Recently much interest and great activity has been displayed by citrus growers in California in propagating "selected" trees and grafting over unproductive trees or whole orchards to "selected" buds obtained from trees of known performance. These are the direct results of long continuous and laborious investigations of A. D. Shamel, of the United States Department of Agriculture, who, with the help of several assistants, has been working on this problem ever since 1909. The results of this endeavor have been embodied in a number of bulky bulletins published by the federal government. They are quite striking and illustrative, to say the least.

The records of Mr. Shamel show that great variability exists within the commercial varieties of almost all cultivated citrus fruits. Thus, for instance, thirteen important strains have been found in the Washington naval orange alone, while the total number of strains existing in this variety, though unknown, may exceed many times this number. Some of these strains have been named and are now used almost exclusively for propagating purposes. Others have been found to be worthless. Tree performance records have shown

that many drone trees of low productivity are to be found in almost every citrus orchard, some having as many as 75 per cent of such trees.

As a result of these investigations most of the citrus fruits propagated in California at present are from buds of selected trees, which have been found either by continuous observation or by tree performance records to be productive and of the desirable type or strain. This practice has become so established that even such dominating and conservative organization as the California Fruit Growers' Exchange has established a special department of bud selection. According to the last annual report of the general manager of the Exchange, this department has furnished to date approximately 1,000,000 buds cut from selected trees, and will increase this number by 250,000 during the present season. Consequently almost all of the leading nurserymen in the state are now propagating their citrus nursery stock only from selected buds.

Moreover, it is estimated that more than 40,000 undesirable citrus trees in California orchards have been top-grafted with selected buds. Some of these top-worked trees are already in bearing. According to Mr. Shamel not a single case has been found where the chosen tree characteristics have not

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FUNGICIDE



been established by means of this practice.

The results obtained in California are given here at length not only due to their conspicuous character, but also because of their economic importance. Here we witness the first really good example where bud selection of fruit trees apparently has become a decided success.

Thus it is clearly seen that generally speaking, there is something, perhaps a whole lot, in bud selection. The citrus varieties are famous, however, for their great variability. Here then one would be tempted to stop and insist that though bud selection may be of profound practical value in the case of citrus trees, it would hardly be worth while to think of bud selection or "pedigreed" stock of deciduous trees. The

apples, pears and stone fruits are conspicuous for their great stability.

Notwithstanding the many arguments that have been advanced pro and con on the subject of bud selection of deciduous trees, it has not yet been settled. There are many fruit growers of life-long experience and wide reputation who are firm believers in this prac-

tice. Thus George T. Powell, a well known fruit grower of New York, in a paper recently read before a convention of California nurserymen, relates his valuable experiences with bud selection extending for more than 30 years. It is the firm belief of Mr. Powell that buds for propagating purposes should be chosen from trees or

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parts of trees of known type, vigor and productivity. Scores of such opinions may be obtained from other growers of like experience. There are many horticulturists, to be sure, who are taking the opposite side and declaim the idea. The many and extensive investigations conducted by several agricultural experiment stations in the United States and Canada are of particular significance in this respect. With but a few exceptions they have given invariably negative results.

In view of the present widespread interests among fruit growers of the Northwest in setting out new orchards

and the current activities of the California growers respecting "selected" buds, it seems to be timely that the question of pedigreed or selected trees should be given a careful consideration. It may be well then to ask where we stand on this question. What information has been precipitated by horticulturists and plant breeders regarding the value and practicability of bud selection of horticultural plants and particularly so of deciduous fruit trees? How much is there in it anyway?

The subject leads us straight to the consideration of the nature and frequency of bud variations. It is of com-

mon knowledge that no two trees are exactly alike in an orchard, as no two buds or fruits are the same on a tree. Modifications or variations in nature are the rule, not the exception. This is true with all plants and parts thereof. It is due primarily to the instability, change, and hence continuous difference in both the internal and external environment of the plant. Most of these modifications are, however, so small that they are of no particular significance to the fruitgrower. In fact they are a blessing to all of us, for what dreadful monotony would there be if plants of a certain kind or variety and their fruits would be exactly alike.

Sometimes, however, variations of this type are of such a degree that they may be very striking and quite valuable to the fruit grower. The exact causes and reasons of such cumulative and expressive variations are not known, all one can tell is that they are the results of impressive and striking changes of the environment. In literature, such variations are referred to as "discontinuous variations," "somatic variations," or less pretentious terms are used, such as "fluctuating variations," or simply "modifications" or "fluctuations." Technically of course more or less clear cut differences could be drawn regarding the proper use of these terms, for our purposes, however, it looks as if the last two terms would be as good as any and would convey the proper meaning. Hence, because of their general instability, we shall call variations of this type fluctuations or modifications.

Fluctuations may be exhibited by any part of the plant, stem, branches, leaves, buds, blossoms, fruits, etc. They may appear in various forms. The fruit may be larger or smaller in size, or may exhibit a modification in form, color, or time of maturity. The eating or keeping quality may have changed. Then, of course, the tree itself or part of it may be so modified that it will bear prolific crops or remain unproductive. Recently it has been shown that because of fluctuating variations, trees may be changed from a condition of self-fertility to that of self-sterility and vice-versa. These are but a few illustrations.

Concluded in next issue.

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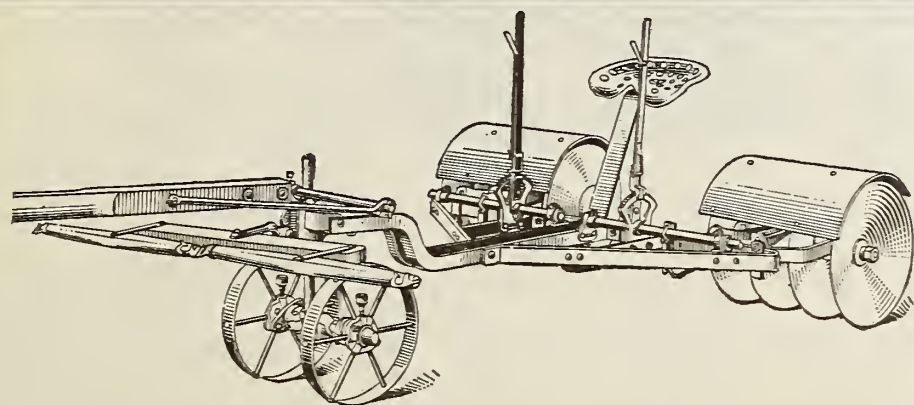
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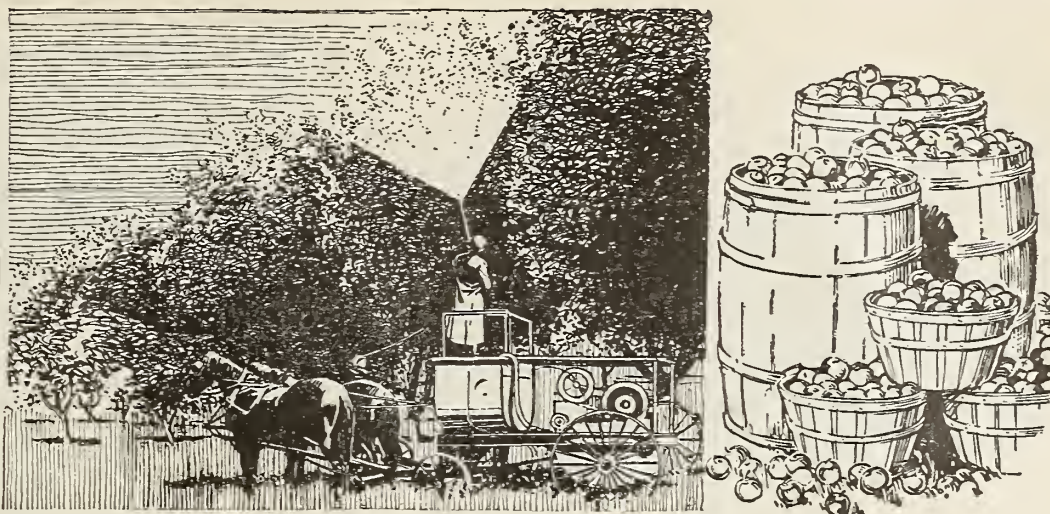
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## Founder of Oregon Horticultural Society Dies.

Ezra Leonard Smith, born in Vermont in 1837, died at Hood River, Oregon, January 22, 1921, in his eighty-fourth year.

While a student at Lombard University, Galesburg, Illinois, Mr. Smith attended the Republican Convention in Chicago, in 1860, when Abraham Lincoln was first nominated for the presidency.

He came to California in 1861 and interested himself in mining, later going to Washington Territory, of which he became Secretary in 1867. Mr. Smith was associated with the group of men who established the first bank in Olympia.

March 1, 1876, with his family, he arrived in Hood River. He early became interested in fruit growing and planted one of the Valley's first commercial orchards. Through his love for fruit trees, Mr. Smith, affectionately known among his friends as "Hood River" Smith, quite naturally became a leader of the men engaged in their culture. He was one of the founders and for several years president of the Oregon Horticultural Society and during the years of his long and useful residence in Hood River, was an enthusiastic leader in the local fruit industry.

## Care of Your Assets.

In the home of the country dweller, infinitely more than in the city, the wife is an asset and not a liability! In view of the multitudinous duties devolving upon her, surely she deserves much consideration.

The fruit grower who, year after year, is forced to get along the best he can with inadequate equipment—doing by hand what he should have a machine to do, working early and late under heavy handicaps—will not remain in the industry long. Under such conditions he will dispose of his place, at a loss if necessary, and seek some other less arduous and more hopeful employment.

The average fruit grower's wife could not sell her place, nor could she give it away if she wanted to, but she is loyal enough and true enough not to want to. Yet, how often is she forced to do by hand what she should have a machine to do? Running water in the kitchen, at least; electric power, what a vista that opens to the imagination—

easier wash days, brighter light in the evening by which to sew, and a dozen little helps in the day's work. Does anyone but the wife herself know what it means to get along without these things? (Her helpmeet should know.) She is a practical asset!

Upon her should he bestow at least as much consideration and attention as he gives to the equipment for orchard operations, and in return she will give to the home health and contentment.

## Adequate Fruit Inspection Imperative.

Every shipper and grower should stand solidly back of any move to improve fruit inspection. It is only the perfect fruit which has won for the Northwest and the Pacific Slope its world-wide reputation. The grower who is not "for" rigid inspection and enforcement of grade and pack regulations is a menace to the fruit industry of the territory. It is unfair that one careless shipper in a community should jeopardize the returns of every grower whose fruit happens to be shipped in the same car.

The Pacific Northwest, through its progressive methods of handling its enormous fruit tonnage, has attracted

## IMPORTANT NOTICE TO SUBSCRIBERS

Effective January 1st, 1921, the subscription price of "Better Fruit" was reduced to \$1.00 a year, and subscribers who have renewed recently at the old rate of \$2.00 a year will be extended in accordance with postal regulations.

the attention of practically every fruit producing country in the world. They are copying the great American Northwest, buying the same orchard and packing house equipment, adopting the same rules of pack and grade, and, having learned all we can teach them, are entering the lists against their teacher.

Surely this is no time to let down the bars.

## Hope in the Freight Rate Situation.

Growers and shippers of fruit may well be encouraged by the current discussions of existing freight rates. The subject has been thoroughly aired at every convention or other gathering of men who are interested in fruit production or transportation and there are many evidences that the railways themselves are becoming alarmed at the effects of the existing rates and will use every means within their power to readjust them before another shipping season.

The current rates, which went into effect last September, are approximately 25 per cent higher than the rates which existed before that time and in the brief period since the new tariffs became effective, it has been demonstrated that in many cases they absorb all the profits from fruit shipments and leave the grower with a net loss on his year's operations.

There can be only one result of the continuation of these tariffs and that is decreased production and shipment, with resultant loss in profits to land owners, growers and railways alike, and market scarcities which will be both inconvenient and disastrous.

When the freight increases were allowed, the one thought which seemed to be uppermost in the minds of the tariff makers was that the railroads must be given a chance to make more money. There is little indication that the new tariffs were scientifically formed or that the tariff makers gave any thought to the ultimate effect upon such industries as fruit growing. Back of the increased rate is the unholy control which the railway labor organizations have over the railroads. While wages and other lines of industry are gradually being adjusted to meet reduced prices, the railroads are tied up by government fiat to a schedule of wages and operating regulations which make it extremely difficult for the railroads single-handed to reduce rates.

There is reason to believe, however, that when the public understands the situation, public opinion will be a powerful factor in bringing about the establishment of tariffs which will be fair to railways, labor and industry, alike.

Did you tackle the trouble that came your way

With a resolute heart and cheerful;  
Or hide your face from the light of day  
With a craven soul and fearful?

Oh, a trouble's a ton, or a trouble's an ounce,  
Or a trouble is what you make it;  
And it isn't the fact that you're hurt that counts,  
But only how you take it.—Anon.

## What Papers Interested in Fruit Are Saying

### ORDER PACKAGES EARLY.

If the fruit growers want a guaranteed supply of baskets next year, they should give their order early to the manufacturer—this month or next—and permit the manufacturers to deliver a certain percentage of the baskets direct to the fruit growers' barns or railway station as early as he wishes. This advice from the pen of Mr. J. M. Wallace, president of the Oakville Wire-bound Box and Basket Co., Ltd., in a recent issue of the *Toronto Globe*, is sound business. While the manufacturer does not expect payment until the following October, he wants orders in early so that he may run his plant throughout the year, instead of the usual procedure of closing down for a number of months during fall and winter. The Clarkson Fruit Growers' Association, which buys supplies of all kinds for 172 members, has placed an order for about 42,000 crates and 1,250,000 berry boxes for delivery at any time direct to the members' barns. A far-sighted policy of that kind will be well repaid when the next fruit rush is on. Other associations and individual growers might well follow the example, and order now.—*The Canadian Horticulturist*.

### ACTION NEEDED IN FREIGHT SITUATION.

Column after column of news and comment from the trade concerning the freight rate situation and its effect upon the fruit and vegetable industry have been printed in *The Packer* during the last few weeks. Distribution of food is being curtailed, production threatens to be checked materially another season, freight tonnage is being reduced and something must be done at once to relieve all factors in the perishable food industry.

The railroads are not going to lower their rates unless they can be shown that the present freight costs will reduce their income by curtailing the volume of traffic. Once the heads of the railroad companies are convinced of this fact, they will voluntarily go to the Interstate Commerce Commission and



ask for authority to put lower rates into effect at once. The problem before the growers, shippers and distributors, then, is to show the railroads wherein their present attitude concerning freight rates is having the effect of reducing the shipments of perishable freight.

The trade, acting as a unit from all parts of the United States, ought to ask a conference with the responsible railway executives, and armed with facts and figures, show the carriers just what harm the high freight rates are doing to the fruit and vegetable industry and the resultant loss to the railroads in decreased tonnage. Every state in the Union should be represented in this conference, and it should be called soon enough to all new rates which might be agreed upon to be put into effect before another crop season arrives. —*The Packer.*

During the months of October, November and December, 98 permits were issued by State Engineer Percy A. Cupper, covering the appropriation of water from various streams and other sources for the irrigation of 28,398 acres of land, the development of 180 horsepower, domestic, mining, fluming lumber, and various other purposes, at an estimated cost of approximately \$100,000. Seven reservoir permits have been issued, covering the storage of 3,714 acre feet of water.

Among the more important projects contemplated for irrigation development are the Fort Klamath Meadows Company, of Fort Klamath, Oregon, for the irrigation of 9,318 acres of land in Klamath County, with the waters of Four Mile Creek, Seven Mile Creek, and Anna Slough; A. M. Geary of Portland for the irrigation of 7,100 acres of land in Klamath County, with the waters of Upper Klamath Lake, and the Mt. Reuben Mining Company of Grants Pass, Oregon, covering the appropriation of water from Reuben Creek for development of 87 horsepower at an estimated cost of \$10,000.—*Medford Sun.*

That the eastern barrel crop is now practically off the market and that there is a better outlook for the western box apple is the opinion expressed recently by Harry Lassen, traveling representative of the Bean Sprayer interests. Mr. Lassen, whose business takes him into the various apple growing centers throughout the world, had just arrived from the East, where he devoted close study to the conditions there. He stated that western growers of the later varieties, especially Newtowns, are justified in being optimistic concerning the future, for, with the barrel crop now off the market, there will be an increasing demand for the boxed variety, which, he thinks, will begin to show an upward movement immediately.

While there has not been any great demand in the home market for western fruit, prices have shown a slight improvement over those prevailing two weeks ago.

The English market is rapidly improving, and with the sharp rise in exchange and the cutting of the freight rate on Atlantic steamers, there are indications that next month will bring better returns. Latest quotations from England show the following prices for boxed apples, extra fancy, \$2.99, C. grade \$2.61 to \$2.80; Oregon Newtowns from \$3.92 to \$4.67 per box; Spitzenbergs, \$2.99 to \$3.36. Last weeks for the first time this season, the box shipments were heavier than those of the barrel variety.—*Hood River News.*

NOW is the time to send to

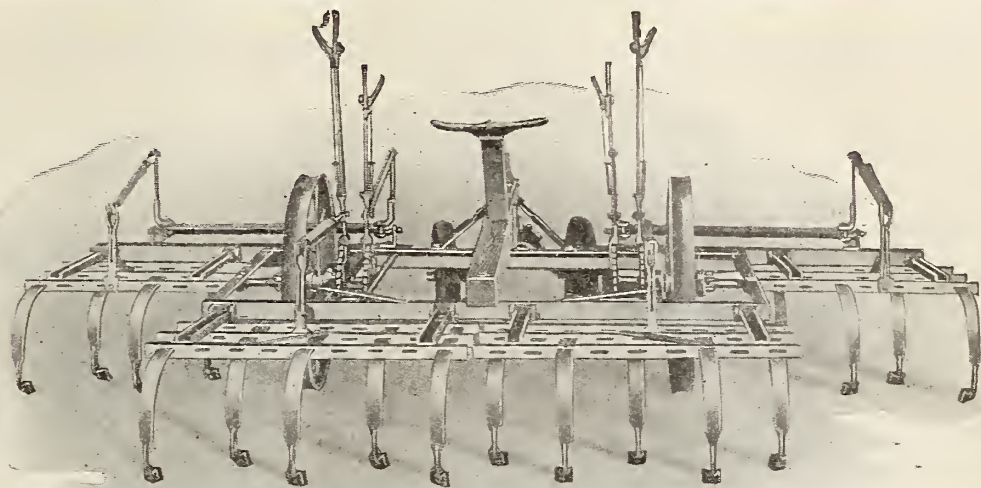
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MILTON, OREGON

FOR THEIR 1921 CATALOG  
FULL LINE OF NURSERY STOCK

"Genuineness and Quality"

## GOOD SEEDS

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## Better Orchard Cultivation AT LESS COST

The Orchard Cultivator illustrated above stirs the soil up from the bottom, it does not simply push it to one side, nor does it leave ditches and ridges, but instead leaves the soil in a wavy level condition.

### The Forkner Light Draft Harrow No. 32

Has been built especially to our specifications for orchard use and we have sold a great many of them to Northwestern orchardists who report that they are the best orchard cultivators they have ever used. The Forkner Light Draft No. 32 is to be had in horse or tractor drawn styles and as built for us is of extra heavy construction, heavy frame and sections and teeth extra size and strength.

LET US MAIL YOU CATALOG OF THIS ADVANCED  
ORCHARD CULTIVATOR

A Full Line of  
Farm Machinery

**Mitchell**  
LEWIS & STAYER CO.

**Myers' Spray Pumps and  
Power Sprayers**

**Cutaway and Lean Harrows**

PORTLAND—SPOKANE



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Garden, Flower and Field Seeds, Plants, Bulbs, Trees, Berries, Incubators, Brooders, Poultry, Bird and Pet Stock Supplies, Fertilizers, Sprays, Etc.

A Western Catalog for Western Buyers. Up-to-date, complete and nicely illustrated—a reliable, truthful guide.

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We are Growers,  
not merely Dealers.

Bartlett Pears on resistant Japan  
stocks in quantity.

Most Extensive Assortment of  
Hardy Ornamentals in the  
Pacific Northwest.

**J. B. Pilkington, Nurseryman**  
Portland, Oregon

## OUR TREES

Carefully Grown  
Carefully Selected  
Carefully Packed

Will give satisfaction to the  
planter

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Salem, Oregon

Additional Salesmen  
Wanted.

## Oregon Nursery Company

ORENCO, OREGON

Since 1867 Growers of

## DEPENDABLE TREES

Fruit and Ornamental  
Trees, Shrubbery,  
Berries, Roses,  
etc.

Large Illustrated Catalog  
sent on request.

## Blight-Proof Surprise Pear Stock on Japan Root

Don't worry about blight taking your pear orchard. Plant the blight-proof Surprise and insure against loss. The following year topwork it to Bartlett, Bosc or any desired variety and you have a blight-proof trunk and framework. This method is endorsed by Professor Reimer of the Southern Oregon Experiment Station, Talent, Oregon, and recommended by him after extensive experiments. Thousands of these trees have been planted the last few years in California and Southern Oregon, and to some extent in the Yakima Valley, Washington. Our buds were secured direct from Professor Reimer.

Twenty thousand discriminating families last year secured stock of us. This year our business is better than ever. "There's a reason," and that is the class of stock we deliver and the service we render.

For other dependable fruit trees, shade trees, roses, vines, etc., write

## WASHINGTON NURSERY CO.

Toppenish, Washington

Salesmen everywhere. More wanted.



## Yakima & Columbia River Nursery Company

Growers of Choice

## FRUIT TREES SMALL FRUITS AND ORNAMENTALS

Yakima, Washington

"Yakima Grown" is  
the best guarantee.

## WE CAN SUPPLY YOU WITH THE CLARK SEEDLING STRAWBERRY

in large lots.

Also—

ANJOU PEAR  
BOSC PEAR  
BARTLETT  
DELICIOUS  
ITALIAN PRUNES  
ROYAL ANN CHERRY  
WINTER BANANA

Many kinds of Peach trees and  
other sorts for the home orchard.

**Ideal Fruit & Nursery Co.**  
HOOD RIVER, OREGON

## FILBERT TREES

I have choice trees of the  
most approved varieties.  
They are of my own grow-  
ing, hence the supply is  
limited. Please state when  
writing the varieties and  
number of trees wanted.

## DR. J. H. WILKENS

Box 126

McMinnville, Oregon



Thrifty, well rooted plants offered,  
grown in the famous

PUYALLUP VALLEY

Blackberries	Currants
Raspberries	Dewberries
Loganberries	Grapes
Strawberries	Rhubarb
Gooseberries	Asparagus

## Rosecroft Nurseries

F. H. Burtlehaus, Proprietor  
SUMNER, WASHINGTON



# Some Reliable Northwest Nurserymen

## Capital City Nursery Co.

Our Specialty:

### Apple, Prune and Walnut Trees

ORNAMENTAL AND FRUIT BEARING SHRUBBERY

A good line of trees for WINDBREAK AND SHADE

Address, Salem, Oregon



Every nursery using this trademark has subscribed to a standard of ethics which obligates for quality, efficiency and honesty in every practical way. It signifies a fight against all questionable schemes, methods and utterances that would lead to disappointing results with nursery products. General cooperation affords satisfaction to planters and nurserymen.

## CHOICE Nursery Stock

We still have a surplus in many lines, including Apple, Pear and Cherry Seedlings, Gooseberry and Currant, Strawberry plants and Logan tips. Your want list will be appreciated.

If you are interested in stock for next year it will pay you to correspond with us.

### Portland Wholesale Nursery Co.

971 Sandy Blvd., Portland, Oregon



## UNIQUE HOME COLLECTION

<b>ALWILD</b>	Strawberry Better Canner	<b>FREE</b>
<b>PRODUCTIVE</b>	Everbearing 15 plants	<b>\$ .25</b>
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<b>UNIQUE</b>	And one other ALL PREPAID	<b>\$9.10</b>

**EVERGREEN PLANTATION**  
NEW MEADOWS, IDAHO

## Canyon Home Nursery

### Strawberry Plants for Spring Delivery

Everbearing Strawberries a specialty.

Extra Fine Marshalls.

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## Idaho's Largest Nurseries

Wants your orders for

TREES, SMALL FRUITS, SHRUBS, ROSES, PERENNIALS.

Highest Quality—Lowest Prices.

Inquire about our  
FREE LANDSCAPE SERVICE

**Kimberly Nurseries**

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## The Woodburn Nurseries

WOODBURN, OREGON

Growers, not jobbers. All of our offerings are our own growing. Think what this means to the planter.

APPLES, PEARS, PEACHES  
PRUNES, LOGANBERRIES  
STRAWBERRIES, ASPARAGUS  
ENGLISH HOLLY

Three generations of Settlemyer's growing trees in Oregon.

Grandfather .....1850  
Father .....1863  
Son .....1892

Buy your trees from those who know how.

## Modern Methods of Codling Moth Control

W. H. Wicks, Director Bureau of Plant Industry, State Department of Agriculture, Boise, Idaho

**I**N THE Idaho horticultural law as passed by the fifteenth session Idaho legislature, 1919, we find the following:

Section 2077. Spraying for codling moth. "All apple and pear trees of bearing age within the State of Idaho infested or known to be infested at any previous season with codling moth shall be sprayed at least two times each season with arsenate of lead solution or its equivalent, first spraying to be made within thirty days after the first appearance of the blossoms on the tree, second spraying within thirty days from time of first spraying."

As a result of the most recent and thorough experiments in addition to the successful practices of successful growers and the experience of the inspectors of the Bureau of Plant Industry, State

Department of Agriculture, this section is recommended for revision to the sixteenth session of the legislature as follows:

"All apple and pear trees of bearing age within the state of Idaho infested or known to be infested the previous season with codling moth shall be sprayed at least two times each season with arsenate of lead solution or its equivalent, first spraying to be made when petals have fallen and before the calyx closes, and the second application to be given on the date and in the manner specified by the Department of Agriculture."

Spraying for codling moth is therefore necessary in complying with the horticultural law of the state.



**Extent of Apple and Pear Industry.**

In connection with the enforcement of this law it is interesting to note the extent of the apple and pear industry as shown by an inventory taken of the fruit situation by inspectors in 1920. From a card index record of all orchards in the state there are 26,759 acres devoted to apples and 284 acres in pears. This represents the commercial acreage that must be sprayed for codling moth as well as isolated pear and apple trees throughout the state.

In 1919 as estimated by the Federal Bureau of Crop Estimates, Bureau of Markets, State Department of Agriculture, State Horticultural Society and railroad officials, the apple crop amounted to 4,000 cars divided into districts as follows:

	Cars
Payette-Weiser District.....	250
Boise Valley District.....	500
Twin Falls District.....	400
Lewiston District .....	350
Emmett Valley.....	115
Coeur d'Alene-Moscow District.....	114
Other Districts.....	21
Pears .....	6

For 1920 the Department of Agriculture figures our apple crop at 4,875 cars, pears 10 cars.

**Horticultural Inspection Districts.**

Until 1920 the state was divided into 16 districts which was based on the geographical formation and the location of the fruit industry in each which was designed to facilitate the inspection service. In 1920 the state was divided into inspection districts based upon the car-lot production of commercial fruit. It is now divided according to the following districts with an inspector in charge of each district:

Boundary County District.  
 Bonner County District.  
 Kootenai County District.  
 Latah County District.  
 NezPerce-Lewis-Clearwater County District.  
 Jonathan-Crystal District.  
 Payette-Crystal District.  
 Washoe Bench-Payette District.  
 Fruitland District.  
 Council District.  
 Boise-Beatty District.  
 Perkins District.  
 Meridian-Eagle Heights District.  
 Nampa District.  
 Middleton-Homedale-Caldwell District.  
 Parma-Apple Valley-Roswell District.  
 New Plymouth District.  
 Emmett Valley District.  
 Twin Falls-Filer-Buhl District.  
 Idaho Falls District.  
 Blackfoot District.  
 Pocatello District.

**Detailed Plans of Codling Moth Control.**

The conditions during 1919 were extremely favorable for the congenial development for fruit pests, particularly codling moth, San Jose scale and red spider, and due to much lack of interest on the part of many growers in caring for their orchards the loss from worms and scale for this year as proven by the cull pile at harvest time was estimated at 25 per cent average state loss of the apple crop, 15 per cent being due to worms and 10 per cent being due to scale. By redividing the state, strengthening the inspection service under the reorganized Department of Agriculture and a concerted effort on the part of the growers to reduce the culls due to codling moth and scale to the lowest possible amount in 1920 the following plan was inaugurated and carried out:

**Codling Moth Control Based Upon a Study of Its Life History and Activities.**

"You have been sent 20 pieces of mosquito netting for the purpose of making an inverted cone around 20 trees for the purpose of trapping the emerging adult codling moth. These trees should be selected in various parts of your district which will represent the various elevations and environments which you believe will influence the activity of the codling moth. These cones should be placed on the trees just as soon as the calyx spray is given. Cut out the center of the cloth to fit the size of the tree trunk, tie this tightly around the tree trunk with a strong cord so the moth cannot escape between the bark and the cloth, placing the cloth about 2 feet up the trunk. Spread

out the bottom of the cloth in a circular manner as far from the tree trunk as possible. Peg it down first with small sticks and then cover the edges firmly with dirt which will prevent the wind from blowing up the edge of the cloth. This will make an inverted cone. The essential thing is to pick out locations and trees where you have the greatest chance of trapping a number of emerging moths. These will be coming from under rough bark on the trunk and rubbish on the ground near the base of the tree. Watch these cones from day to day for the emergence of adult moths which you will see fluttering under the cloth. The insect control poster which you have distributed in your district gives the details of how the traps and burlap bands are used.

"When the first moths appear advise

# Your 1921 Fruit Tonnage

When planning the handling of your fruit tonnage this year, we recommend that you consider the merits of independent marketing.

Prior to the advent of Produce Reporter Organization independent marketing was fraught with grave risks, but since the advent of the "Blue Book" you can ship to distant points with impunity.

Particulars cheerfully furnished  
upon request.

**Produce Reporter Company**  
**938-948 State-Lake Building**  
**Chicago, Illinois**

New York, Boston, Washington, Minneapolis, Los Angeles, Sacramento, Yakima



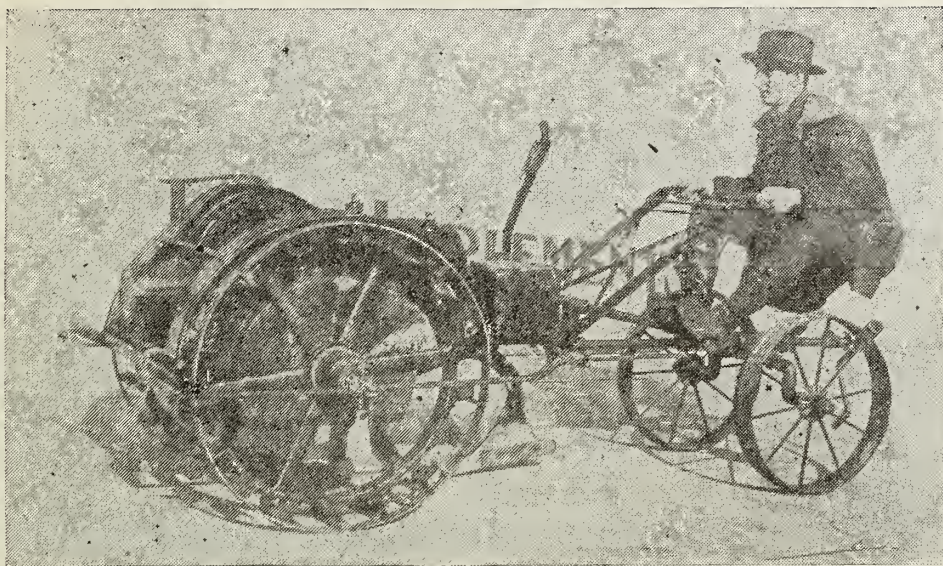
through the papers of your district that the second spray, or sometimes spoken of as the first cover spray, should be given two weeks from the date the moths begin to emerge. Be sure that your specimens are representatives of the sections of your district and from your study of the traps give the date for the entire district.

"To date the third spraying, put 30 to 40 burlap bands around the tree trunks, watch for worms two or three weeks after the second spraying and date the third application 25 days after the first worms are caught. These bands

should be put on the trees immediately after you put on the cones, but put the bands on separate trees. By having the bands and cones in the same orchard it will be handy for you to take care of both on the same trip. Cut the burlap in strips 12 inches wide and long enough to go around the tree. Fold over 4 inches which will permit an 8-inch flap to hang down the tree. Tie tightly so the worms will crawl down over the burlap and up under the same for protection and pupating. These bands should be about 2 feet from the ground.

"It will be necessary in order to name the spray dates most accurately for you to observe the cones daily in order to determine the date when the first moths are seen under the netting. Refer to the bulletins, from the University of Idaho, Utah and Pullman, Washington, which have been sent you, in regard to the life history of the codling moth."

The district under the supervision of an inspector is sufficiently small that close supervision of details is possible pertaining to each orchard in his district. The inspectors were authorized to work among the growers, lending all possible aid in securing spray material, urging repair of spray machinery and better equipment if necessary and

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## FOR THE ORCHARD

Takes place of team; costs less to operate.

Biggest small tractor, smallest big tractor made.

**Only \$460** f. o. b. Portland. 5 H.P., weight 1100, height 36 inches, width 36 inches, turning radius 6 feet.

AGENTS WANTED. Write for particulars.

**ALEXANDER BADLEY CO.**

Distributors for Oregon and Washington

425 E. Morrison Street, PORTLAND, OREGON

EWING

## Orchard Ladders

LIGHTEST AND MOST DURABLE.

SUCCESS

## Box Lid Presses

SWIFT IN OPERATION. STRONG IN CONSTRUCTION.  
LAST LONGER. GIVE BETTER SATISFACTION.

It Pays to Buy the Best

WRITE FOR LITERATURE AND PRICES

**Success Seed Grader Co. Inc.**  
Spokane, Washington

### Free Spray Calendar Tells When to Spray-What to Use

The Dow Spray Chart is the result of years of experiment and research. It tells how to care for apples, cherries, plums, grapes, currants, gooseberries, peaches and other fruits—explains insect enemies and diseases of potato, tomato, cabbage and vine crops. Directs the mixture of all spray materials, tells the proper time for spraying and how to apply each particular spray. You should not be without this Calendar if you grow fruit of any kind. We will gladly send it free. Quality brings the high price and quality is not possible without spraying. Write for this free chart today.

### Dow Powdered Lead Arsenate

Extremely light and fluffy—Dow Powdered Lead Arsenate possesses many advantages over the heavier and more granular varieties. It mixes so readily and remains so well in suspension that it entirely covers foliage with a milky, filmy coating. Because it reaches and covers every part of foliage and branch—because it sticks where it touches and because of its high content of arsenic, it has a deadly effect on all forms of foliage eating pests. Dow Powdered Lead Arsenate is a great economy and a great convenience. Managers of large orchards and directors of state stations have used this product for years and now purchase in carload lots.

Packed in ½, 1, 5, 10, 25, 50, 100 and 200-pound containers. Sold through our dealers or direct where we are not represented.

Ask for folder describing all Dow Spray Materials. The line includes Dow Powdered Lead Arsenate, Dow Powdered Lime-Sulphur, Dow Lime-Sulphur Solution, Dow Paste Lead Arsenate, Dow Powdered Calcium Arsenate, Dow Powdered Bordo, Dow Powdered Bordo-Arsenate. These are the finest spray materials known, for the control of vegetable and orchard pests, and are used by the world's leading orchardists and state departments in carload lots. Send coupon below for our free Spray Calendar.

**THE DOW CHEMICAL CO.**  
MIDLAND, MICHIGAN, U. S. A.

Trade



Mark

SEND FREE SPRAY CHART TO

Send  
This





in assisting wherever possible for the production of better fruit.

All neglected orchards or plants which were known to be a source of public nuisance were sprayed by the owner, the state or cut down. Cooperation in this matter was given by fruit growers desiring to grow good fruit to stimulate interest in this pest control campaign. Five thousand copies of an insect control poster were distributed in stores, depots and other public places and given to fruit growers who desired a copy of the same. In addition to giving the life history of the codling moth, San Jose scale, peach twig borer and red spider, this poster gave information in regard to insecticides and a time of applying them for each one of these pests. Throughout

the pest control campaign three outstanding facts were constantly kept before the mind of the growers. These facts are: (1) proper spray material; (2) proper time of application; (3) thorough work in applying.

The Bureau of Plant Industry has frequently been informed by insecticide dealers and dealers handling spray equipment that they sold more spray material and more modern spray equipment during 1920 than any previous year. The prospective high prices for fruit and a determined effort on the part of the fruit growers to reduce the loss by worms to the minimum were factors which brought splendid cooperative action in this matter in connection with the newly organized pest control work.

# USE Nitrate of Soda (CHILIAN)

## WHY?

BECAUSE, it is a plant food increasing the vigor of your orchards.

BECAUSE, its application is recommended by all government authorities and experiment stations in the Northwest.

BECAUSE, it is the cheapest source of nitrogen so essential to plant life.

The early application is productive of best results.

*For literature and quotations write or wire:*

## The Nitrate Agencies Co.

8th Floor, Hoge Building  
Seattle, Washington

### Test of Spray Material.

Practically all of the standard makes of arsenate of lead were used and tested. All proved good.

During the spraying season of 1920, inspectors of this bureau endeavored to make an official Baumé test of the concentrated lime-sulphur solution which was used in their district and also a test of the spray material in the spray tank of commercial sprayers and growers. In all 534 tests were made. The records show that the lime-sulphur as it came from the factory average 33° Baumé and the average test in the spray tank was 5° Baumé. When a commercial sprayer or grower was found with a less degree he was immediately urged to increase the strength. This met with ready response. Chemical analysis of lime-sulphur solution were made by the state chemist in cooperation with this bureau and practically all samples show satisfactory analysis.

### . Results.

The records of the inspectors of this bureau show that in orchards properly sprayed at the right time less than 1 per cent worm damage, ranging as high as 60 per cent in orchards improperly sprayed and cared for. A detailed statement is given in the following table:

District	Per Cent Scale	Per Cent Worms	Per Cent Bruise Undersize Frost	Per Cent Loss All Causes
Perkins .....	2	10	7	19
Beatty .....	2	5	7	14
Ichleberger .....	5	5	10	20
Ustick .....	10	10	7	27
Wood Station...	10	10	10	30
Manville Station...	10	10	15	35
Yost .....	3	10	10	23
Bissell .....	2	5	7	14
Meridian .....	2	3	6	11
Onweiler .....	2	3	7	12
McElroy .....	10	5	10	25
Victor Station...	10	5	8	23
McDermott .....	4	2	3	9
Noble .....	1	2	1	4
Sonna .....	1	2	9	12
Ten Mile .....	1	2	15	18
Kuna .....	7	5	20	32
Sandpoint .....	0	1	\$20	21
Council .....	0	5	3	8
Bonnors Ferry...	*10	†2	\$20	32
Coeur d'Alene...	0	2	6	8
Moscow .....	0	‡0-100	3	28
Lewiston .....	5	10	¶50	65
New Plymouth...	1	20	4	25
Payette .....	1	6	**4	11
Parma .....	1-	11	2	14
Emmett .....	1	4	††5	10
Grangeville .....	7	3	¶15	25
Twin Falls .....	0	30	5	35
Blackfoot .....	0	10	4	14
	3.6	7.5	9.8	20.7

\* Oyster Shell; † Codling Moth; ‡ Average 25%; § Scab; ¶ Hail; \*\* Frost 2, Bruise 2; †† Hail 3, Frost 2.

For 1920 the loss due to worms for the entire state shows an average of 7.5 per cent with an additional loss also of 3.6 per cent due to scale. Thus it is seen that the worm loss was reduced 50 per cent over the previous year and the scale loss considerably more. It should be borne in mind that these figures represent the average and that many conscientious fruit growers had practically no loss due to worms or scale.

The pest control campaign for 1921 is planned on a similar basis and by earnest cooperation on the part of all fruit growers the damage from worms and scale for the state is expected to be materially reduced over the results of 1920.

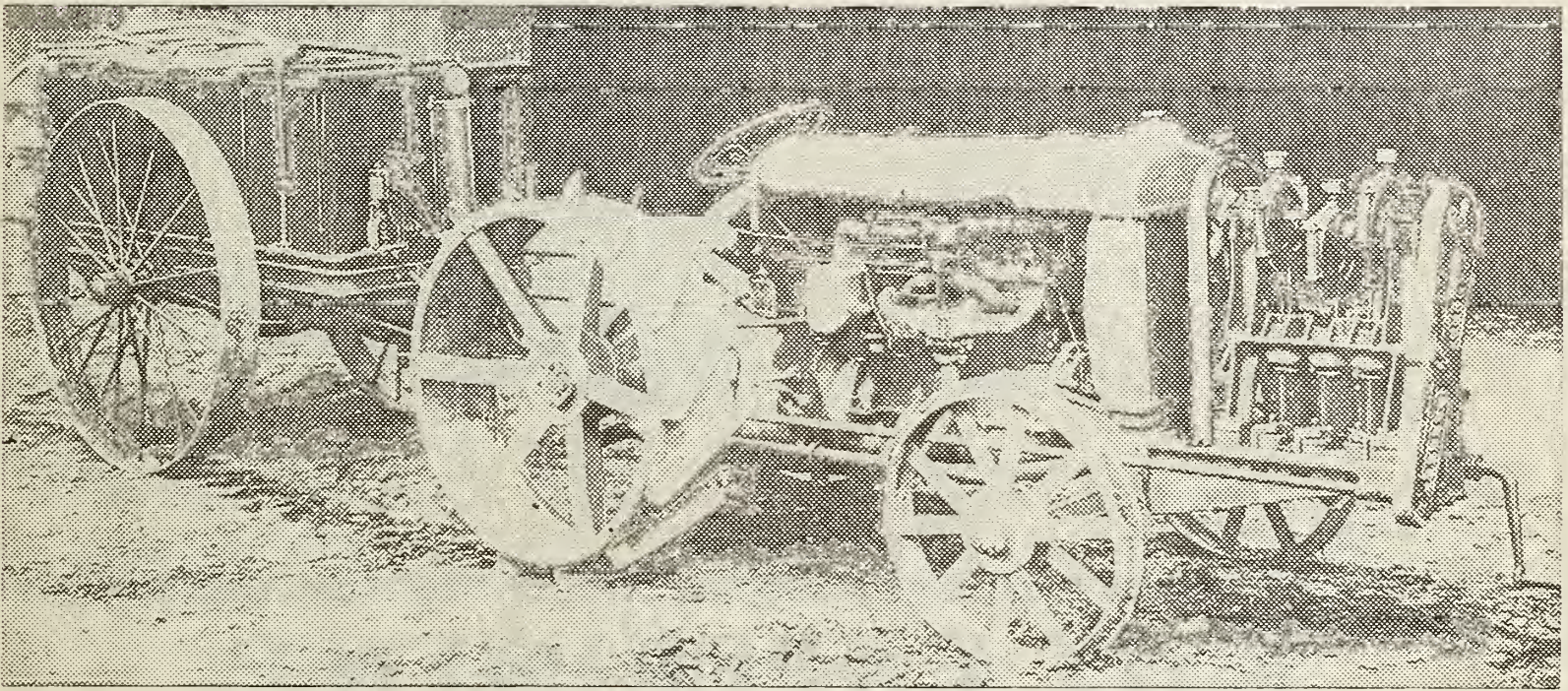


# The Big Two-In-One

## A Bean Sprayer and A Fordson Tractor

### IN COMBINATION

Gives You the Power of the Tractor Behind Your Spray



This marks progress of the best sort, combining perfect

## Efficiency with Economy

In one hour the sprayer can be detached, and your tractor is ready for other use. The 300-gallon tank and the return trips made three times as fast as with horses, saves much time in refilling.

It will pay you, Mr. Grower, to write us for full particulars or see your nearest Fordson dealer.

## E. A. Mitchel Tractor Co.

Distributors for

Oregon, Washington, Northern Idaho,  
Western Montana

314 East Madison Street, Portland, Oregon  
Branch, 151 South Post St., Spokane, Wash.

### READ WHAT ONE BIG GROWER SAYS:

RICHEY & GILBERT CO.  
YAKIMA VALLEY FRUITS  
PRODUCE

Yakima, Wash., October 5, 1920.

Fred Chandler Inc.,  
Yakima, Wash.

Dear Sirs:

The Fordson Super-Bean Sprayer which we have used in our apple orchards through the summer of 1920 has given satisfactory service. It has been used 360 hours, putting on six sprayings. The pressure and volume of liquid thrown has been anything we desired. The ability of the outfit to get about among the apple laden trees without knocking off the fruit has been greater than any horse-drawn outfit.

Between sprayings the spray outfit has been removed from the Fordson so that the tractor could be used for disking. Since the tractor can thus serve a double purpose, we believe a combination such as the Fordson Super-Bean Sprayer will prove dependable and we will make additions to our spraying equipment along that line.

Yours truly,  
H. M. GILBERT.



## Spray Guns and Their Operation

Continued from page 4.

perfect control of the liquid, you had better get one that will or go back to rods and nozzles.

If you could follow a minute particle of spray from the gun nozzle you would find that it would go forward in a spiral direction. When it reaches the point where the air resistance is equal to the pressure behind it there will be a sort of roll and it will float in the air. Every cubic inch of air space will be full of this finely atomized liquid which will thoroughly cover either the fruit or the limbs. This can be accomplished only by a high pressure depending on the distance sprayed as I stated before.

At one time I was showing the gun to a crowd of fruit growers when this point came up. I sprayed a telephone pole until it was dripping, standing about fifteen feet from it. On examining it we found that it only lacked a few inches of covering entirely around the post. The second post was sprayed from the same distance, using about the same amount of water. On examining it we found that only the half next to us was wet. The first had been sprayed with the gun only open enough for the spray to well reach the post where it floated in the air like a cloud of smoke. On the second post the gun was wide open and the spray which did not strike the post was going from ten to twelve feet beyond it. What struck the post on the sides was deflected off

with the driving pressure behind it. It did not roll or cover any of the surface not directly in line with the nozzle. Had this been a fruit tree the results would have been unsatisfactory.

In regard to using the gun on calyx spray. There is the same difference of opinion as I mentioned before, even among our leading horticulturists. I have always contended that the right gun properly operated would do just as effective work as any rod and nozzle and can be accomplished with less labor and liquid. However, as I said before, you must have the pressure to give you a very finely atomized spray. There are different densities of water, from ice to the finest fog. If you would dip a calyx into a bucket of water you would get it all wet, a 100 per cent perfect spray. You, of course, cannot do that in an orchard, but you can take a high pressure and atomize the water. In other words thin it down and entirely envelope the blossoms in a cloud of thin water long enough for the inside of every calyx to be thoroughly coated with spray regardless of the angle at which they stand. This finely atomized spray will enter calyx that are closed too much for a coarser spray to enter and will therefore give you better results than a driving spray which is nearly always a coarse spray.

Care should be used in handling the gun to see that you are not over shooting by having the gun too wide open and driving the spray beyond the blos-

soms instead of filling the area around them with a cloud of spray. You cannot cover the far side of an apple or the inside of a calyx with a solid stream of coarse spray shot from the ground.

Some operators have made a mistake by long distance spraying and too little walking. You will not get the results at thirty feet that you will at fifteen, regardless of the pressure you are using. Bear this in mind and wherever possible get within fifteen feet of the point you want to spray.

Much depends upon the operator regarding material saved and effectiveness. I have known of some instances where there was 40 per cent saving on material, the man doing 70 per cent as much as two men with rods and nozzles. Other instances where one man did more than two men, but kept no record of material. My observations prove to me that one man with a gun will do 80 per cent as much as two men with rods and nozzles with a saving of about 12 per cent in liquid. These same men tell me they are getting a lower percentage of wormy apples than ever before, using the gun for all sprays and getting as low as one-half of 1 per cent wormy apples.

In these days of close competition and small profits it behooves the fruit grower to produce the maximum quality with a minimum spraying cost and the right spray gun will be a big aid in solving the problem.

# WHY EXPERIMENT WHEN YOU CAN SPRAY WITH DORMOIL The Miscible Oil for Dormant Use

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der, large wheel  
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## Four Sizes THERE IS ONE FOR YOUR ORCHARD

### TESTIMONIALS

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Hood River, Oregon.

Gentlemen:

I have been using a large size “Friend” sprayer for two years and as far as I can tell, both from my own experience as well as that of others, it is the best sprayer made.

It has eliminated a large amount of the “troubles” of spraying and does the work so much quicker than other sprayers as to be a great satisfaction. This matter of time saved is of much more value than is represented by the cost of labor saved, for in many cases it means that the spray is put on the trees when otherwise it could not be, on account of bad weather.

I certainly would recommend this sprayer to anyone who has considerable spraying to do.

(Signed) W. J. Cady,  
Hood River, Oregon.

“I have used three different makes of sprayers, but never got real satisfaction until I bought a ‘Friend’ sprayer a year ago. They have both power and deliver plenty of material to do efficient work.”

(Signed) Edward E. Lage,  
Hood River, Oregon.

“We have used a ‘Friend’ AX sprayer the past season on our 60-acre orchard and same has given us the best of results.

“At this time we would not consider changing to any other make of sprayer on the market, for we believe the ‘Friend’ AX sprayer is far superior to the other sprayers being offered for sale at present.”

(Signed)  
Harbake Land & Development Co.  
By W. W. Hardinger, Pres.  
Hood River, Oregon.

Before you decide on any sprayer, see a “Friend” owner. He will tell you what “FRIEND” CONSTRUCTION means—not only in ease and speed in spraying, but in the actual saving of money from fewer replacements, fewer repairs.

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HOOD RIVER, OREGON



## Northwest Fruit Notes from Here and There

### OREGON.

The Hood River Apple Growers' Association still holds in storage about 270,000 boxes of fruit. It received in all for the past season 943,930 boxes.

The apple acreage in Oregon, according to the figures of the Oregon Growers' Cooperative Association, is 50,000. The prune acreage is about 40,000, while that of pears is 13,500.

C. I. Lewis, manager of the organization department of the Oregon Growers' Cooperative Association, is still strong for prunes, notwithstanding present conditions. He says that ultimately, prunes will prove as they have in the past, a good investment.

In the planting of cherries, he calls attention to the fact that the Royal Anne, Bing and Lamberts are not only self-fertile, but also inter-sterile, and that with these varieties must be planted the Long Stemmed Waterhouse or some other good pollinizer.

The Spitzenberg apple is likely to come into its own within a few years, Mr. Lewis says. He believes the time is coming when this apple will sell at a premium as the acreage has been greatly reduced, due to collar rot in

the Inland Empire and winter injury in the Hood River country.

Mr. Lewis is of the opinion that next year will be a good year for apple growers in western Oregon, as the East is not likely to have a bumper crop next season as it did last year.

Jackson County fruit growers, through the Oregon legislative assembly, have addressed a memorial to the Honorable, the Secretary of Agriculture, earnestly petitioning the Department of Agriculture to maintain the frost warning service with which the weather bureau has been serving the growers of the Rogue River Valley for several years, during the spring months when orchard heating is practiced. The memorial says, in part:

Whereas, this service has proven of inestimable value to the fruit growers of that section as a guide in the taking of measures for the prevention of frost damage to their crops, whereby many hundreds of thousands of dollars worth of fruit crops have been saved, and

Whereas, the fruit growers of that district, many of whom were at first skeptical as to the value of frost prevention measures, have rapidly grown to appreciate the value of the same by reason of the results obtained during

the years this service has been maintained by the weather bureau, and are building up a stable horticultural practice of frost prevention measures under the direction of the weather bureau's representative sent to the valley each spring.

Therefore, be it resolved, that the legislative assembly of the state of Oregon earnestly petitions the Department of Agriculture to maintain the frost warning service hereinabove referred to without interruption, to the end that many thousands of dollars worth of fruit crops may be saved to the growers of southern Oregon.

Gordon Brown of the Hood River experiment station is doing a real service to local growers contemplating setting out nursery stock this spring, having procured the names of Washington nurserymen who can supply stock in quantities. There is a heavy demand for small fruit and berry plants in the Valley, and several hundred acres will be set this spring.

The organization of the Oregon Mint Growers' Association to further the production and marketing of peppermint oil was completed at a meeting of growers at Eugene, recently.

Professor A. Zieffle, head of the school of pharmacy of Oregon Agricultural College, spoke to the growers on the methods of harvesting and curing the crop and the most effective manner of distilling the oil. The plan of the Oregon Mint Growers' Association is to link together all the mint interests of the state in production and marketing, and it was shown by statistics that it would be possible not only to increase the revenues from the industry, but to quadruple the output in the Valley, which was about 10,000 pounds last season. With their own refinery in the Valley, operating under the best methods, it is believed that the growers will derive a far greater margin of profit.

### WASHINGTON.

Washington's shipments of white potatoes were slightly greater by Christmas last year than they were at the same time in 1919, 2,022 carloads being shipped last year and 1,874 shipped the year preceding.

Frank Miller, manager of the Zillah branch of the American Fruit Growers, Inc., recently made a statement against the packing of 5-tier apples in a year such as 1920. He said, in part:

"There would have been a different market situation today had we let alone packing 5-tier stuff for home consumption.

"The growers would actually have made more money, for the large sizes would have brought them more per box and they would not have had the loss which they are now sustaining on the 5-tier stuff. It clearly was a blunder to pack the 5-tier, but no concert of action was possible and with some concerns packing them of course the rest did the same."

What is the answer? Is it cooperation?

Whereas there have been a good many sales lately of Wenatchee Winesaps at \$2.00 per box, the large sizes are held at \$2.50 to \$3.00. Holders of the big sized fruit are confident that they will realize more later in the season.

It is estimated that the Wenatchee district has grown 9,300 cars of apples and has shipped 7,500 cars, leaving 1,800 cars still to be disposed of.

Apple shipments for Washington for 1920 up to December 25 fell 4,000 carloads behind the shipments for 1919. The shipments for last year was 14,712 carloads as compared with 18,958 at the corresponding date of 1919.

Prosser fruit men agree that present indications favor a bumper crop next season. Orchardists are convinced that trees have recovered from the damage occasioned by extreme weather last winter. There has been no zero weather this year. E. Bowles, who harvested \$11,480 worth of cherries from 6½ acres in 1919 and got virtually no crop last season, was of the impression last winter that his trees were nearly all killed, but he now reports that he lost only 14 trees out of his entire orchard and that he is assured of a heavy crop next season.

**Manchurian Walnuts.**—In the month of January, 1920, there were 4,000 sacks—approximately 200 tons—of walnuts imported to the Port of Seattle from Manchuria, China. These arrived after the holiday season of 1919. There was little sale for them, as we understand, and they were held in dry storage during the hot months of 1920, allowing them to become rancid and unfit for food, after which they were placed in cold storage for a few months and then placed on the market for sale about

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**WORLD'S LARGEST MAKERS OF STUMP PULLERS**



Thanksgiving Day, 1920, or the beginning of the 1920 holiday season. The standard on walnuts is they must be 85 per cent or more good; two shrivelled nuts counting as one. These walnuts were traced over the state to Spokane, where we found them in the hands of retail dealers, transfer, express and railway companies. They were seized, samples taken, sent to the state chemists, and found to run from 32 to 80 per cent bad. The original shipment at Seattle was seized, and now the State Food Division has "nuts to burn."

Twenty-six tons of potatoes to the acre is the record made by Edward J. Bedard of Cowiche, who planted five acres with Minnesota seed last spring. Mr. Bedard gave the crop personal attention and irrigated it five times, each application being light. The total yield for the five acres was 130 tons and potato men say it was a perfect crop in every respect.

#### IDAHO.

A pamphlet is being prepared which will show that the work of the University of Idaho extension division, in cooperation with the county farm bureaus, has added \$6,716,000 to the profits of Idaho agriculture in the last two years, according to an announcement from the office of L. W. Fluharty, director of extension. This seems like a big sum for farm bureau and extension work to have added to Idaho farm profits in two years, but when you consider that 10,000 farmers have helped to make and save it, it doesn't look so large.

Idaho's apple shipments up to December 25 last amounted to 2,312 cars compared with 3,197 carloads for 1919. The state shipped 4,913 carloads of white potatoes in 1920, as against 5,002 cars in 1919.

**\$3,000 Extra on Cherry Crop.**—Organization of a cherry growers' association is considered by the county farm bureau the outstanding feature of its horticultural program for the year just past. The association obtained a price for its cherries that exceeded previous offers by three cents a pound and represented an added profit of \$3,000.

Five hundred thousand acres of arid land lying between Boise and Mountain Home may be thrown open to irrigation through a tunnel from the Stanley Basin.

### What They're Doing in California

California is the leading honey producing state of the Union, and the Sacramento River and the bottom land area produces tons of honey each year, purely as a by-product of other crops, for blossoming plants such as alfalfa, fruit trees and the wild shrubbery and flowers along the banks of the river afford an abundance of nectar for the busy insect. Sutter County, in which Sutter Basin is located, boasts of thousands of stands of bees. Most of these are of the perambulating type for the owner transports them about, following the honey flow. One grower has 2,000 stands and carries them up and down the Sacramento River on a small barge, placing them on the banks of the stream where the blossoms are abundant. At certain seasons of the year he even takes some of his stands over into Nevada to gather sagebrush honey. California honey producers are organized into a cooperative association and they are marketing the product direct to the trade. Only recently they made their first shipment direct to New York. This shipment consisted of 400,000 pounds, which went by steamer through the Panama Canal.

The annual meeting of the California Fruit Exchange in Sacramento and it is stated refunds aggregating between \$675,000 and \$700,000 to the growers was made by the organization. John L. Nagle, manager of the exchange, announced that the refund totaled 5 per cent of the gross sales of the year, the total business amounting to \$13,500,000. Last year the dividend amounted to 4.72 per cent, while the disbursement of the previous season was 4.47 per cent.

Potato growers of Marin and Sonoma Counties met in San Francisco recently and formed a potato growers' association under the prefix of "Northern California."

As the result of the committee of seven appointed by the governor meeting with forty representatives of various railroads in Chicago recently, the railroads agreed to a sched-

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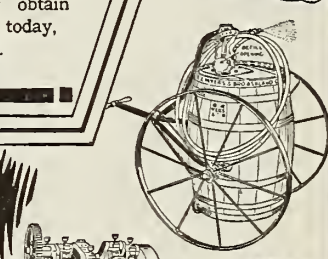
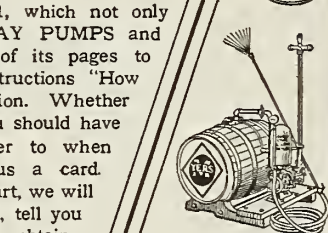
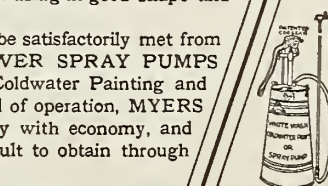
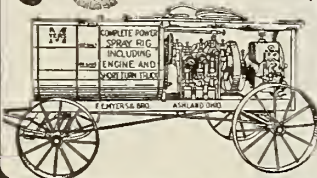
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**F.E. MYERS & BRO.**  
ASHLAND PUMP AND HAY TOOL WORKS  
135 ORANGE ST.  
**ASHLAND, OHIO.**



You are going to spray again in the near future. No doubt you are thinking about it already. Just a question of a few weeks until the weather is right then the fight against the numerous enemies of plant and tree life will be renewed with vigor. Perhaps, your old spraying equipment is about worn out and will have to be replaced with new. Possibly, you will only need a new nozzle or two, a spray gun, some hose or fittings to put the outfit you have been using in good shape and thus make it do for another season.

Whatever your need, be it small or large, it can be satisfactorily met from the MYERS line of "Honor-Bilt" HAND and POWER SPRAY PUMPS and ACCESSORIES for Spraying, Whitewashing, Coldwater Painting and Disinfecting. Regardless of style or size, or method of operation, MYERS SPRAY PUMPS combine efficiency and durability with economy, and thus produce a standard of spraying service difficult to obtain through the use of other spray pumps.

Our new Spray Pump Catalog, No. SP21, which not only shows the complete line of MYERS SPRAY PUMPS and ACCESSORIES, but also devotes many of its pages to spraying calendar, reliable formulae and instructions "How and When to Spray," is ready for distribution. Whether you need a new Spray Pump or not, you should have a Myers Spray Pump Catalog to refer to when doing your spraying. Just drop us a card. Without the least obligation on your part, we will mail you a copy and if you so desire, tell you how and where you can quickly obtain MYERS SPRAY PUMPS---Write today, the 1921 Edition is limited.



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ule of eight days to Chicago and twelve days to New York, instead of the nine and thirteen days time existing at present.

The deciduous tonnage rolling east out of California this year is approximately 40,000 cars and it is anticipated that the tonnage of deciduous fruits in five years' time will be close to 100,000 cars. It is also stated that about 60 per cent of the citrus acreage is bearing at this time but that the production from the bearing acreage is around 60,000 cars and it is estimated that the movement of citrus fruits will be increased by 6,000 cars per year for at least the next five years.

### Notes Oregon Growers' Association

C. I. Lewis, with the Oregon Agricultural College 14 years as chief of the horticultural department, and now manager of the organization department of the Oregon Growers' Cooperative Association, advises the planting of the Bartlett, Bosc and Clairgeau pears. The Anjou is not favored as it has a functional disease and is slow coming into bearing. Nor does Mr. Lewis recommend the Winter Nelis, as it does not produce large fruit in western Oregon.

R. C. Paulus, sales manager of the Oregon Growers' Cooperative Association, reports the pear pool for this season amounted to \$495,590.47. Bartletts ranked first with sales of \$241,996.97 with the Bosc second, its sales amounting to \$78,211.55. Anjou pears were third with sales of \$56,871.52 and Winter Nelis fourth with sales of \$14,000.00.

C. I. Lewis of the Oregon Growers' Cooperative Association believes in the future of the

apple industry of Oregon. He says history repeats itself in apple crops, and that next year the West may look for a big crop, with a short one in the East.

Although there was the largest pear crop in the United States last year ever known, members of the Oregon Growers' Cooperative Association received the highest prices on record west of the Cascades. This was due to skillful handling by the association, holding pears in cold storage and awaiting favorable market conditions.

From the Oregon Growers' Cooperative Association comes this information to those who intend to plant cherries: With the Royal Anne, Bing or Lamberts, which are not only self-sterile, but inter-sterile, plant about one-fourth in Long Stemmed Waterhouse, or some other good pollinizer.

It is now the prune rather than the raisin when it comes to mince-meat. J. O. Holt, packing manager of the Oregon Growers' Cooperative Association, at the Eugene plant, is making a prune mince-meat much better than that manufactured with raisins by the big packing plants. It is just another way of patronizing a home industry, even if you make your own mince-meat. Use prunes and help Oregon.

The name "Mistland," by which the Oregon Growers' Cooperative Association is selling Oregon prunes in New York City, seems to be quite a favorite. Now we have in Salem a Mistland gun club, a Mistland bakery, and even a Mistland orchestra.

The large prune dryer constructed by the Oregon Growers' Cooperative Association at Sheridan, has been completed at a cost of \$20,000. The dryer is of 40 tunnels capacity.

### Bits About Fruit, Fruitmen and Fruit Growing

Department of Agriculture reports the value of farm crops for year 1920 as around \$9,000,000,000, as against \$14,000,000,000 for the year preceding.

The federal horticultural board is now admitting fruits from Cuba, the Bahamas, Jamaica and the canal zones only after vacuum fumigation.

The steamers "Marconi" and "Vauban" recently arrived at Buenos Ayres from New York with 24,000 packages (boxes and barrels) of apples and 4,000 boxes of pears. Particular mention for arrival in good condition was made of boxes from Hood River, Yakima and Payette.

#### SPRAYING PAYS.

Ralph Irwin of Lancaster, Wisconsin, found that spraying his orchard of 680 trees returned him 5,487 per cent on his spraying investment. This is the report he made to F. R. Gifford, extension man for the horticultural department at the Wisconsin College of Agriculture, who aided him. It cost Mr. Irwin, according to his records, \$228 to buy the spray and apply it. It took 1,500 gallons of mixture for each of the four applications, and 20 hours' work on the part of two men and a team. The eighty hours work he figured at \$140. On one sprayed tree, an average one, he picked eight bushels of clean marketable fruit which sold for \$2.50 a bushel. There were 30 unmarketable apples on this tree, and these were only slightly injured. On one tree which was purposely let unsprayed, four bushels were picked. The ground was covered with rotten apples. Of the four bushels of apples taken from the tree, but 10 apples were clean.



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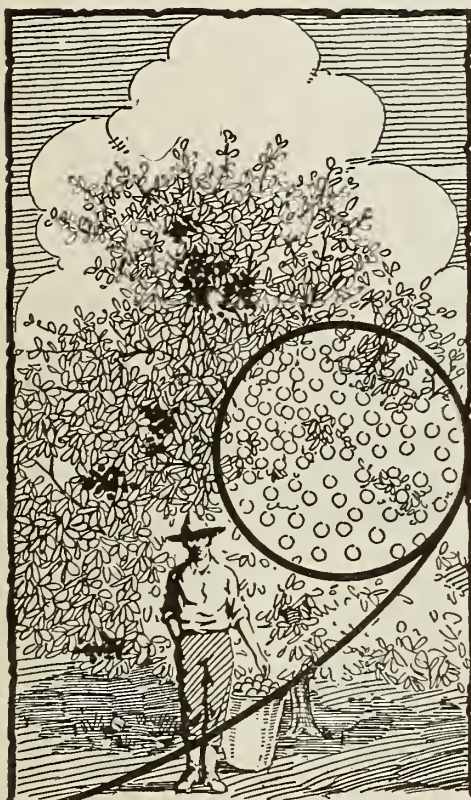


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YOU wouldn't leave actual  
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A FACT: In actual use in an  
apple orchard it resulted in an  
increased yield of 100 bushels  
and improved the quality.

Write for book of results.

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The grocers refused to buy them for \$1. The market value of the apples on the sprayed tree was \$20; from the unsprayed tree about \$1. It cost 34 cents a tree to make this difference. Of course, he says that spraying pays.

Senator McNary is doing his utmost to secure a tariff on cherries and English walnuts. Italian cherries are now selling in New York City at seven cents a pound in brine. Unless there is a tariff, the cherry and walnut industry of the Northwest is in for several hard seasons.

The purchasing department of the Michigan State Farm Bureau is developing rapidly. It estimates conservatively that it saved members \$20,000 during November and December. The State Horticultural Society has placed in the hands of the purchasing department the business of handling spray materials for its members. Cooperation properly applied makes converts wherever practiced.

Chinese and Japanese walnuts were selling last month at seven cents a pound wholesale. The meat is dark and often wormy, but the average buyer did not know the difference between the Japanese and the sweet meated Oregon walnuts until they got them home. Hence the need of a protective tariff.

### HOW SHALL THE FRUIT GROWER PAY HIS INCOME TAX?

The government allows the farmer to make his income tax return in one of three ways, namely: On the cash basis where he accounts for all receipts and disbursements only; on the crop basis where he deducts the cost of raising each crop from the proceeds of its sale; and on the accrual basis where he takes inventories and accounts for all sums owing him from the sales as well as for the sums received and deducts all expenses, whether paid or merely incurred. Practically all income tax returns of farmers in this district have been made on the first basis mentioned, namely, the cash basis, and it is this class of taxpayers that are now interested in having their expenses allowed against their income from sales of grain in 1921.

The big question is how the farmer who has sold only part of his 1920 crop can get credit for all of his expenses incurred in 1920 against the income from the sale of the entire crop, sold in 1920 and 1921. The answer to this question is that the farmer must change his system of accounting from the cash basis to the accrual basis and set up an inventory of his crops on hand on December 31, 1920, valued at market price less the cost of marketing. But this change must be carried out strictly according to regulations, which are as follows:

Treasury decision 2,873, Paragraph 3 reads: "A taxpayer who changes the method of accounting employed in keeping his books for the taxable year 1919 or thereafter shall, before computing his income upon such new basis for the purposes of taxation, secure the consent of the commissioner. Application for permission to change the basis of the return shall be made at least thirty days in advance of the date of filing return and shall be accompanied by a statement specifying the classes of items differently treated under the two systems and specifying all amounts which would be duplicated or entirely omitted as a result of the proposed change."

There were 79,133 barrels and 77,342 boxes of apples shipped to Europe from American ports during the week ending January 15. Of these, 51,586 barrels and 74,239 boxes were shipped from ports of the United States, 32,109 barrels and 62,025 boxes going out of New York alone. All of these were shipped to British ports with the exception of 4,347 boxes which went to Scandinavian countries.

Cable advices give the following apple prices prevailing in various British cities: Baldwins in London \$7.03@8.32 per barrel; in Manchester \$4.62@6.47; in Hull \$6.47@7.77. Yorks in Glasgow \$5.18@6.29; in Southampton \$6.10@8.32; Greenings in London \$7.03@8.32 per barrel. Box apples—Winesaps in London \$2.77@3.15; Oregon Newtowns in London \$3.42@4.07. California Newtowns, four and one-half tier, in London \$3.24; Spitzenbergs in boxes at Southampton \$3.24@3.42; box apples in Manchester \$2.60@3.15.

The first shipment of the season of South African peaches and plums reached New York on January 24th on the steamship "Adriatic," F. A. Richmond & Co. being the receivers. The fruit is from the orchards of Dutch growers in Cape Colony, and is remarkable for the careful and dainty manner in which it is packed. The carriers are small, flat boxes holding 24 peaches or 40 plums. Each peach

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NORTHWESTERN MANAGER

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Portland, Oregon



or plum is wrapped in tissue paper, and then bedded in a nest of excelsior. The receivers state that prices will be \$10@12 per box for either peaches or plums. The fruit is mostly the same varieties grown in the United States, especially in California, the peaches being all Alexanders, while the plums are of the large red and purple varieties so well known in this country, the bulk of this shipment being Santa Rosas. Later, it is said, Wickson, Kelsey and other familiar varieties of plums will be coming. Although the shipment had been on the way for fully 30 days, the fruit showed excellent condition.

The rally in sterling exchange will benefit Northwest apple growers, according to Walter R. Woolpert, of the Dan Wuille Co. at Hood River. With exchange at \$3.73, according to Mr. Woolpert, growers here will net \$1.88 per box for all apples sold at the control price of 23 shillings, 6 pence.

"We have received no notification," says Mr. Woolpert, "that the British government will lift price restrictions on March 31, as announced from other sources. That would be too late to be of any benefit to us. Indeed, I cannot see how the lifting of control would benefit us any at present, for it is found difficult to keep apples at the control maximum

because of such quantities going on the auction. Practically all Hood River Newtowns, however, have to date, brought the maximum. As for the arrival of Australian apples, I do not see any cause for alarm. The Hood River crop will be well sold before they reach England."

### Cannery Notes

There are 32 canning establishments in Czechoslovakia, very few of which, if any, having canning machinery such as is used in the United States, is the information contained in a report from Trade Commissioner Geringer, of Prague. It is believed that a potential market exists there for canning machinery, and Mr. Geringer believes it would be well for American interests to send their catalogs and price lists to his office, where they may be shown to interested parties. Material addressed to Mr. Vladimir A. Geringer, in care of the Bureau of Foreign and Domestic Commerce, Washington, D. C., will be forwarded to that office.

The Northwestern Transportation Company whose boats ply between The Dalles and Portland on the Columbia River, reports that from

Hood River alone approximately 60,000 boxes of apples were moved to Portland and Vancouver, Washington, the past season by river steamers. A big proportion of the tonnage was consigned to canneries, one plant in Vancouver handling 25,000 boxes of canning grade apples.

### DEHYDRATING PLANT CLOSES.

The Dalles Kings Food Products plant has closed its plant for the season. According to C. C. Ross, manager, the plant has enjoyed the biggest year of its history, having handled 2,250 tons of apples alone. The Libby, McNeil & Libby canning plant will close as soon as the Maraschino cherry run is over. Both will open as soon as the harvest of spring vegetables begins.

### ECHOS FROM THE ANNUAL CONVENTION OF NATIONAL CANNERS.

The fourteenth annual convention of the National Canners' Association, meeting simultaneously with the Canning Machinery and Supplies Association and the National Canned Foods and Dried Fruit Brokers' Association at Atlantic City was one of the best in the history of these organizations. The registration was about 3,000.

The newly elected officers are as follows: Harry P. Strasbaugh of Aberdeen, Md., was elected president of the National Canners' Association; James Moore of Rochester, N. Y., was elected first vice-president, and Frank E. Gorrell, Washington, D. C., secretary-treasurer. The office of second vice-president was created and it will later be filled. The following new directors were elected: W. E. Elwell, Portland, Me.; Albert Horner, Honolulu, Hawaii; L. E. Jastremski, Houma, La.; James Moore, Rochester, N. Y.; G. A. Eastwood, Chicago, Ill.; Richard Stringham, Woods Cross, Utah; Ralph Polk, Mound City, Ill.; John M. Swing, Ridgely, Md.; B. F. Moomaw, Roanoke, Va.; E. F. Trego, Hoopston, Ill.; Bismark

## When It's Too Late Don't Be Sorry—



You spray to protect your crop—spending your time, your money, and your labor in the hope of a future profit. It is weeks or months before you can measure results.

You may have sprayed in just the right season, you may have used the most scientific methods and gone over each plant or tree with painstaking thoroughness—nevertheless, if your insecticide or fungicide was not the best, all your time, money and labor can be largely wasted.

GRASSELLI GRADE Insecticides and Fungicides eliminate regrets and disappointments. Under the Grasselli system of manufacturing precautions a shipment below Grasselli purity-standards can't escape from a Grasselli plant. 82 years of chemical leadership in the United States is behind the Grasselli label.

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Wire Works**

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Portland, Oregon



Houssels, San Francisco, Cal.; Fred Kendall, Portland, Oregon; Luscius E. Hires, Salem, N. J.; Russell B. Kingman, Orange, N. J.

ONE OF THE RESOLUTIONS.

Whereas the canning industry, by reason of its seasonal character has need of large credit accommodation in the normal production and marketing of its products, and

Whereas in case the purchase of canned foods in 1921 by future contracts is greatly reduced, the canners will need unusual credit accommodations, if canned foods are to be produced and carried by the canner until they are needed by the consumers, and

Whereas, this economic essential was admirably stated by the Lever food act, when, in formulating the principles of food conservation, it urged the development of surplus products in the season of natural maximum production, to be carried over into the season of scant or no production, therefore be it

Resolved, that the peculiar condition of the canning industry be fully presented to the federal reserve banks and every possible effort be made to secure their cooperation in extending to the canning industry the full measure of credit to which it is entitled.

The National Canners' Association assembled in its annual convention, representing as it does an industry with an output of an approximate valuation of \$800,000,000 annually, employing approximately 250,000 people, hereby resolves that it be the sense of this convention that the ways and means committee of the House of Representatives be requested to give due consideration to the depressed condition of the industry and to the needs of its various branches. Under the present low import duties, canned foods are coming into this country in increasing quantities from countries where their industries operate upon a lower scale of wages not compatible with the standards of living enjoyed in this country.

We earnestly recommend a duty placed upon all imported canned foods sufficient to offset the difference in the cost of production. This recommendation is made not merely as a means of protection to the industry and as a source of revenue to our government, but as a means for the negotiation for more reasonable tariffs in most foreign countries which now levy prohibitive tariffs upon the products of our industry.

It is believed that in the framing of our new tariff laws due consideration should be given to the necessity for devising reciprocal features which will enable some competent agency of the government to meet promptly the rapidly changing conditions abroad whereby countries now enjoying a ready market in this country may be required to lower unreasonable and prohibitive tariffs now levied

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in many foreign countries against canned foods and many other products requiring an export market.

Plans are under way for the erection in Yuba City, California, of a new cannery. Sutter County is the largest canning peach district of the state and annually ships out 2,000 cars of canning peaches, in addition to those canned by local plants.

O. A. C. Horticultural Notes

COST OF EFFECTIVE SPRAYING.

The cost of a season's effective spraying in Hood River orchards 13 to 14 years old from 1916 to 1919 was about \$45 an acre. Growers employing the average usage of spray per tree each application obtained uniformly good results.—*Experiment Station, O. A. C.*

Spreaders for improving the covering and sticking power of spray solutions are caseinate, glue, gelatine, soap bark and oil emulsions, named in order of their efficiency and cost of preparation. Directions for preparation and use are found in the bulletin, "Insecticide Investigations," for free distribution.—*Entomology Department, O. A. C.*

The total estimated annual millage levies will amount to \$5,752,370.47 of which O. A. C.'s share will be \$1,427,436.41.


Many rainfall farmers of western Oregon have gone back to the intermountain regions of Montana and Idaho looking for new land, forgetting the marshes and tidelands in their own back yard, which, if drained, become the most profitable lands in the state for such crops as garden truck and vegetables, and small fruit and berries. Drainage specialists will help them find out when and how the lands may be reclaimed.—*Experiment Station, O. A. C.*

The physical value of products turned out by Oregon boys and girls in club work in 1920 was \$111,584.60, more than half of which are clear profit. The profit balance was \$55,942.90, as shown by the reports of H. C. Seymour, state club leader.

A. G. Bouquet, professor of vegetable gardening, spoke to the horticultural seminar on "Horticulture in England." He brought out the fact that there is a close connection between Great Britain and the United States in horticultural lines due to our exports. Sixty per cent of the apples exported are sent to Great Britain. The English growers are striving by means of the box pack, not before used to any extent in England, to obtain better recognition of their own fruit. Gooseberries and plums are used as dessert fruits by most Englishmen, according to Professor Bouquet.

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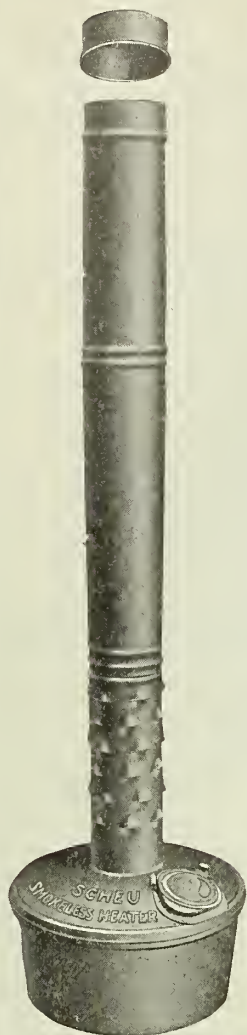


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# Being Whipped by Frost

even occasionally, is now out-of-date and unscientific. Frost, as the stumbling block to your financial success as an orchardist need no longer be considered as a necessary risk that you have to take as a part of the business of growing fruit.

## The Scheu High Stack Smokeless Orchard Heater

has completely changed this old fashioned thought. This orchard heater is just what the name implies and it must not be confused with the ordinary "smudge pot." Thousands of Scheu heaters in orchards throughout the country have proven their worth and never failed to save the crops under the severest weather conditions.

They are safe, clean, efficient and economical to operate. There is no guess work involved. Let us prove this to you. Better wire us, as orders already booked will prevent our accepting many more orders for delivery before this season's danger period arrives.

Complete and full information is yours for the asking.

Our field man, Mr. F. K. Rockett, will be in the Northwest as this announcement appears. Interested orchardists, desiring information or demonstrations may address him in care of "Better Fruit."

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Manufacturers of Orchard Heaters, Plumbing Fixtures, Etc., Etc.

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## Soil Analysis and the Fertilizing of Orchards

By Major E. P. Newsom, Lecturer on Chemistry of Soils Fertilizing

UNDER normal mechanical conditions of soil and water supply, the chemical nature of the soil is reflected in the life, appearance, behavior and fruitage of the tree. Soil analysis is not the angle from which to attack the problem of fertilization. It is an outworn theory and should be thrown into the discard along with that other passe theory, so much in vogue a few years ago, "clean cultivation."

Let us admit that in the Yakima and Wenatchee Valleys we have rock phosphate and potash sufficient for a great number of years, does it follow that we should fertilize with nitrogen and a cover crop alone? By no means. Tell that to the expert horticulturist of the East or Europe, and he will laugh in your face.

### Sources of Potash.

The chief sources of potash in the soil are from feldspar, granite, hornblend, etc., in which rocks it occurs with aluminum in the form of a double silicate. Mud pumped up from the sea to form new land around our city harbors is impregnated with salt, and for the space of two years not even grass will grow on it. But the rain falling upon this newly made land causes the salt to leach down deeply in the soil, and after the space of two years any kind of vegetation will grow upon it. Now, if the rock phosphate and potash were soluble, the same thing would happen—these plant foods would leach down in the soil so deeply within two years, that a farmer could not sprout cow peas on his land.

The double silicate of aluminum and potash is absolutely insoluble in water. The erroneous impression prevails that the use of superphosphate releases the potash. Phosphoric acid acting upon the double silicate of aluminum and potassium gives the double phosphate of aluminum and potash, which is just as insoluble as the double silicate. Carbonic acid, however, being a very weak acid, does not attack the aluminum silicate, but having great affinity for the potassium, does attack the latter, forming carbonate of potash which is soluble.

### Some College Experiments.

That phosphoric acid used alone does not release any appreciable amount of potash is clearly shown by the experiments of the Pennsylvania State College, covering a period of 35 years. The analysis of the soil plats showed the presence of 20 pounds of potash for every one of nitrogen, and 25 pounds of potash for every one of phosphoric acid. One would naturally suppose, if the soil analysis theory were of any value, that if any plant food additional were needed it would not be potash, but rather nitrogen and phosphoric acid, especially so, if the phosphoric acid acted to release and render soluble the superabundance of potash. The results, however, showed that in a rotation of clover, corn, wheat and oats,

covering a period of 35 years, the highest net return on this soil came from plats on which phosphoric acid and potash were applied at the rate of one pound of the former to 2.08 pounds of the latter. Again, these long continued experiments further showed that when either potash or phosphoric acid were used alone, or even nitrogen used alone, the net results were always lessened.

Now, a cover crop of the nitrogen gathering legume is most excellent

since it furnishes nitrogen to the tree from the air and since it fosters through its humus the bacterial life. This bacterial life in functioning generates carbon dioxide and this when absorbed by water furnishes a mild acid, carbonic acid, which is a solvent for calcium carbonate (limestone), rock phosphate and potash. But the bacteria work slowly. One year there is a good crop of fruit, the next year is a "skip" crop, and the third year, perhaps, another good crop. Now, if the soil analysis theory were of any value and we should not use potash and phosphoric acid in our fertilizer, why this "skip" crop?



## Clear *More* of This Land in 1921

PEOPLE in this state are rapidly joining the "Clear-More-Land" movement. Last year was one of the largest land-clearing years in this section. During 1921 an even greater acreage will be cleared and cultivated largely thru the use of explosives. Every one is out to get bigger crops. Most people use



### or Repauno Stumping Powders

because they are generally recognized as quick, efficient and economical means of clearing cut-over land.

Join your neighbors. Clear *more* acres each year. Every acre put under cultivation will return a handsome profit to you.

Your local dealer can supply you with Du Pont or Repauno Stumping Powders and Blasting Accessories. See him and write for FREE book "Developing Logged-off Lands" describing the use of explosives for land-clearing, tree-planting and ditching.

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Simply because the bacteria could not, or did not, work fast enough to render "available" in sufficient amount this potash and phosphate in the soil.

One might as well put brick dust in the soil as to put available potash and phosphoric acid there, expecting results, unless, at the same time, he is absolutely sure that the tree is fed a sufficient amount of nitrogen. Nitrogen forms the wood structure and healthy leafage of the tree. The leaf of the tree is its stomach. It is in the leaf that the chemical changes take place in the plant food drawn up. How foolish therefore to experiment on orchards with potash and phosphoric acid alone, if the tree has not sufficient digestive ability to "eat" it. One might as well place food before a sick man whose

stomach is in no condition to receive it. On the other hand, a tree can be fed up on nitrogen and given stomach capacity like unto that of the fat man of the circus and yet there may be no fruit because the phosphate had not been transformed into available phosphoric acid and the silicate, or some other form of potash had not been transformed into the soluble carbonate of potash. Place the fat man behind iron bars and then a plate of food on the outside, where, perchance, he may see it and smell it, but cannot get it, and what good will it do him?

I believe most thoroughly in a three powered fertilizer, carrying nitrogen, phosphoric acid and soluble potash, varied in ratios to suit the needs of the tree as indicated by its behavior, ap-

pearance, fruitage and coloring of that fruitage.

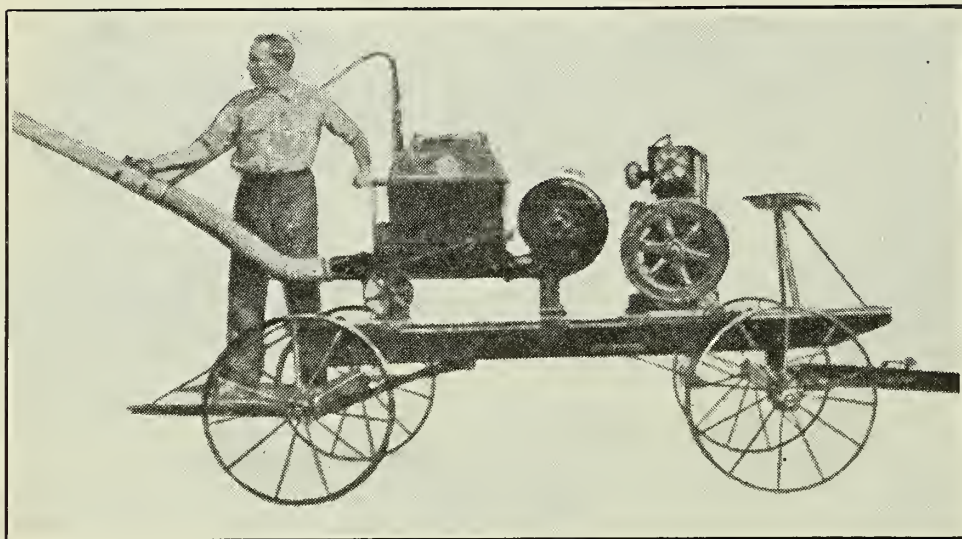
Mr. Leonard Olive of Chelan took me over his orchard, explaining that he had used considerable barnyard manure; that his trees appeared to have plenty of wood growth and healthy leafage, but he was not getting fruit. I prescribed an organic fertilizer of 1 per cent nitrogen, 8 per cent phosphoric acid, 10 per cent potash. I am just in receipt of a letter stating that he had a wonderful crop of fine quality apples and splendidly colored.

Mr. Rudolph Etzkorn, Jr., of Monitor, had a tree, 15 years old, that for the past eight years had never in any season borne more than five boxes of apples which were small and of poor quality. He had used barnyard manure, had cultivated it, but to no avail. The tree appeared "sick." He used an organic, or animal products, fertilizer of the analysis of 6 per cent nitrogen, 10 per cent phosphoric acid, 4 per cent potash. Recently a photograph was taken of this tree, showing 20 boxes of the finest "Jonathans" I ever saw, under the tree, already picked from it, while there were eight more boxes, estimated, on the tree—28 boxes.

Now, if the "soil analysis" theory were tenable, humus and plenty of nitrogen were all this tree needed, and all that Mr. Leonard Olive's trees needed and all that a host of the trees of others needed, since according to the "soil analysis" theory "there is an abundance of phosphate and potash in the soil, sufficient for years, and all that is needed is an abundance of nitrogen and a cover crop."

I have gone over orchards in Oregon and Washington and time after time I have seen trees and sometimes almost the entire orchard—and such I have seen in and around Yakima—that had a lovely cover crop and beautiful green trees, but without apples on them. Is it because the trees get tired and have to rest a year, in accordance with another one of those outworn theories? Surely, if there is an abundance of potash in the soil, etc., all they need is nitrogen. Well, do the trees look like they were not getting nitrogen?

Yes, there is potash and phosphate in the soil, but nitrogen does not render it available. It only enables the tree to "eat" these elements of plant food, when it is available. The bacteria render these elements available, but they work slowly, hence the "skip" crop. A well balanced organic fertilizer invigorates and multiplies the bacterial life; it supplements, in abundance, available plant food, while these micro-organisms are working to render still more of the unavailable available.



## THE NIAGARA DUSTER—THE CROP PROTECTOR

The DUSTING METHOD becoming better understood, is being adopted by many of the progressive growers in Oregon and Washington, and of course they use the NIAGARA DUSTER.

A White Salmon, Washington, apple grower writes, under date of September 25, 1920:

"We are quite satisfied with the way the Duster worked out this year."

You, too, will join the Duster boosters, but right now you need a STRONG, RELIABLE SULPHUR SPRAY.

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For full information on Niagara line, Dusters, Dusting Materials, Sulphur, Arsenate of Lead, Calcium Arsenate, etc., write

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### Sulphur

It has been proven and so recommended by the University of California that if you sulphur your grape vines and orchards 6 times they will not be affected by MILDEW or RED SPIDERS.

ANCHOR Brand Velvet Flowers of Sulphur, also EAGLE Brand, and Fleur de Soufre, packed in double sacks, are the fluffiest and PUREST sulphurs that money can buy; the

best for vineyards; the best for bleaching purposes, LEAVING NO ASH.

VENTILATED Sublimed Sulphur—Impalpable Powder, 100% pure, in double sacks, for Dry Dusting and making Paste Sulphur.

For LIME-SULPHUR SOLUTION, use our DIAMOND "S" BRAND REFINED FLOUR SULPHUR. We can furnish you this sulphur at such a low price that it would pay you to mix your own solution and net you a profit equal to the amount paid out for labor in spraying your orchard, even if you pay your men \$5 per day for making the solution and applying same.

To create additional available plant food, and prevent smut in grain, drill into the soil 220 pounds per acre of DIAMOND "S" BRAND POWDERED SULPHUR, 100% pure, or our COMMERCIAL POWDERED SULPHUR. This soil treatment has increased various crops up to 500%. Send for Circulars No. 6, 7 and 8.

Ask us for prices on PREPARED DRY DUSTING MATERIALS, Tobacco Dust, Dusting Sulphur Mixtures, etc., Fungicides and Insecticides, carried in stock and mixed to order.

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We are equipped to make immediate shipments. Send for Price-list and Samples.

Ask us for prices for Carbon Bisulphide, the surest remedy for destroying ground squirrels.

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says the Good Judge



That you are getting full value for your money when you use this class of tobacco.

The good, rich, real tobacco taste lasts so long, you don't need a fresh chew nearly as often—nor do you need so big a chew as you did with the ordinary kind.

Any man who has used the Real Tobacco Chew will tell you that.

*Put up in two styles*

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## "CARO" fruit

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**"Caro" Protects--** CHEMICALLY TREATED! **--"Caro" Prolongs the Life of Fruit--Why?**

FRUIT MATURITY is retarded by cold or refrigeration and hastened by heat or atmospheric exposure.

The soft fibrous silk-like texture of "Caro" provides just sufficient ventilation to retard the ripening process.

FRUIT DECOMPOSITION starts from a bruise which opens tiny holes and permits juice to escape and BACTERIA to enter.

"Caro" clings closely and dries up the escaping juice. "Caro" ingredients harden the spot, kill the BACTERIA, arrest the decomposition.

United States Distributors, **AMERICAN SALES AGENCIES CO., 112 Market Street, San Francisco, Calif.**



## With the Poultry

Inquiries Answered — Contributions Solicited

### POULTRY PROBLEMS.

It has been demonstrated time and again that no part of the farm work pays so well for the time and money spent upon it as does the poultry when efficiently managed. This is particularly true when the poultry are raised in connection with orchard work. It has been found that scrub hens, with but little care, will pay a profit. How much better then must the good hen with good care pay? A good hen will pay so much better that no reasonable person would be willing to go back to scrub hens after handling the good ones two or three years. If they laid no more eggs, they are so much more pleasant to handle, that we would rather keep them for that reason alone.

With the advent of purebred stock, the wives and daughters of many fruit growers have become interested in the care of poultry, mainly on account of the beauty of a uniform flock, and they have found the profits coming in. As a result, poultry raising has become a fixed industry on many fruit ranches.

Most women are well qualified for the work because they are accustomed to looking after details and the poultry business is one that makes much of the little things. The breed of poultry that may be raised with greatest success depends largely on the individual and local conditions. Some fruit ranches are ideally located for a large flock of Leghorns, where they can have unlimited range and there is nothing that they can harm in their foraging. In other localities, where gardening is carried on to a considerable extent, a heavier or general purpose breed is best because they can be easily yarded or confined to limited ranges during certain seasons when, if running loose, they would harm growing vegetables. Then, too, such breeds produce much more and better market poultry when that phase of the matter is considered.

There is no question about good poultry paying well in connection with orchard work. It is for each individual fruit grower to decide what breed is best suited to his needs.

### POULTRY POINTERS.

Now you will have use for those roosters you have kept all the year and lost money on. The incubator is the hen that never leaves the nest.

It is more difficult to raise than it is to hatch chicks. Isn't that your experience?

Don't feed the chicks for 24 or 36 hours after hatching; then give chick food.



### VIRGINIA GAMES

Fancy Black Breasted Red exhibition games; gamey fighters, excellent layers, fine brooders. We are now booking orders for both eggs and stock.

Green View Poultry Farm  
Waynesboro, Virginia

## Roof Cement

Triangle Brand Liquid Asbestos Roof Cement is a composition of asphaltum, asbestos and other materials fused to a consistency of heavy molasses. It is absolutely waterproof and fire retarding. Comes in barrels ready for use. Applied cold. Anyone can apply it. Will positively make your warehouse waterproof. Saves money.

Write—Our representative will call—anywhere.

Asbestos Products Co.

S 113 Madison Street  
SPOKANE, WASHINGTON, U. S. A.

Good poultry books or pamphlets may be secured by writing to the Department of Agriculture, Washington, D. C. Give them your name.

Fresh green cut bone is great food for growing chicks. Feed sparingly of it, though. This same green bone is also good for the hens that fill the egg basket.

Skim milk is a good feed for the growing chicks. It takes the place of meat.

More chicks are killed by over-feeding than by starvation. Feed a little frequently rather than too much.

Good brooders may be made at home, but it is usually cheaper to get the manufactured ones.

### SELECTING BREEDERS.

Summer-hatched chicks won't do for the early breeding pen. If you must use late-hatched birds for breeding purposes, give them time to mature and do not try to hatch extra early chicks. Even when a late-hatched male bird gives promise of exceptional merit, he will not be as potent as the fully matured bird if he is used too young and his chicks will be lacking in size and vigor, and the chicks from an immature pullet will never amount to much. The habitual use of immature breeders will injure the size and constitution of any flock.

### GETTING WINTER EGGS.

Any kind of food adapted to egg production will do if the poultry houses are warm enough. Warm mash or cooked vegetables, thickened with bran should be given the fowls occasionally, but the necessity for furnishing warm food will be in proportion to the warmth of the quarters. A plentiful supply of water should always be kept before the hens. If the quarters are not warm enough to prevent the water from freezing, better carry out warm water two or three times a day.

### MEAT FOR POULTRY.

An excellent substitute for meat is cottage cheese. It may be fed to fowls of any age and will be found to be very nutritious. We would recommend about three feeds each week of the cheese. We have often heard the inquiry, "Can I not use fresh cooked meat in the place of beef scraps?" In our opinion, yes. If fresh cooked meat may be fed as cheaply as, or better still, cheaper than beef scrap, it will answer every purpose. It should be fed in the same manner and will yield about the same results. Either may be fed to young chicks or to older ones. It is a paying investment to give laying hens about three meals a week of such food. Be sure to obtain a good grade of scrap, for if you use the fresh meat, cooked, it must be fresh and not old or putrid.

If it is desirable to feed animal food in the form of a mash, use the beef meal; use the scraps as dry food. Good beef scraps should contain about 50 or 60 per cent protein, never more than 15 or 20 per cent fat.

About the best and cheapest mineral food obtainable is crushed oyster-shell. Do not, however, make the mistake of using this for grit. Do you know that small, round smooth stones or pebbles are not grit? Use hard, rough crushed stone or broken crockery, something to act as teeth for the fowls to grind up their food. If the fowls run at large they will find grit, but if confined, it must be supplied to them, for it is indispensable to their good health.

### POULTRY YARDS.

The fruit grower can get along very well without a poultry yard; but he can get along better if he provides at least two small yards about the poultry house. There are always chickens to be shut off from others nearly all through the year. When once you have provided yourself with an extra enclosure or two, you wonder how you ever got along without them and will be inclined to add a couple more.

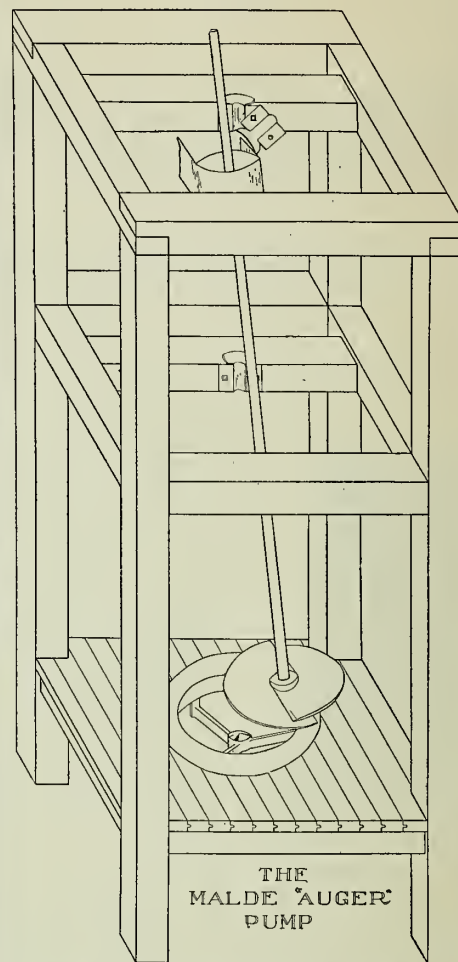
### FEEDING CLOVER TO POULTRY.

Use second-growth hay, cut into very short lengths, one-quarter inch if possible. Scald and let stand until next morning. Add a teaspoonful of salt to every gallon of water used in moistening the clover. Before feeding, sprinkle with a mixture of bran, turning over occasionally until the whole is well mixed with the grain food. Fowls will eat this readily and it will prove an excellent change in the diet.

### DESTROYING REFUSE.

Refuse material that is taken from nests should always be destroyed by fire. Nests are the real breeding places for lice when kept at

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the same temperature by setting hens and more lice are hatched than chickens. All nests should be cleaned at least once a week and every portion of refuse should be consigned to the flames.

#### FEEDING THE YOUNG CHICKS.

After the chicks are a few days old, they should be fed three or four times a day on a clean surface which might be flat pieces of board. As soon as they appear to be satisfied, the surplus should be removed. This has particular reference to soft food. Ground oats or cracked corn may be left where the chicks will have access to it at all times, but not on the ground.

#### MILK FOR POULTRY.

Milk is a rational egg-producing food and should be liberally given wherever it can be cheaply obtained. Any kind of milk, whether fresh or sour or clabber will do for the hens. They will drink it when set before them, or it may be put in a soft food, adding a tablespoonful of soda to every quart of milk.

Rats are always a pest about the barns and poultry houses, but they are a real menace during the baby chick season, for they take their toll of the youngsters each spring. Poison bait is said to be the best way to deal with the rat. But they are very cunning and soon learn to avoid any one kind of bait and, therefore, several quite different kinds should be used in rotation, a grain, a meat, a cheese and a vegetable for instance. The U. S. Department of Agriculture recommends barium carbonate for poisoning bait. This is very poisonous to children and domestic animals and must be used accordingly.

The Oregon Poultry Producers' Association has recently been organized under the name of the Pacific Poultry Producers, and will operate in Washington as well as Oregon. Anyone who can ship at least one case of eggs a week through the summer should join. There are already more than 160,000 hens signed up, and it is expected that 200,000 will be represented. The association is in a measure co-operative and plans to prevent the market from being flooded at any time, and to maintain fair prices. The association claims to return to the producer 85 per cent of the selling price, instead of the 62 per cent he would receive from the speculator.

Give the setting hen a quiet, dark place in which to sit. She will come off once a day and will return to the eggs before there is any danger of their becoming chilled. Some dry place nearby should be provided in which she can take a cleansing dust bath. Fresh, clean water should also be easily in reach. Do not handle the eggs more than necessary. If one becomes broken, the others should be taken out and sponged off with warm water. Soiled nesting material should be replaced with fresh.

Cockerels from January and February hatches, if caponized in April and May, and turned into the orchard in June, where they can get plenty of green feed, will make a very fair substitute for the turkey for the Thanksgiving and Christmas dinners. If well fattened, they should weigh 8 to 10 pounds and better.

Better results are obtained when fowls are fed according to appetite than according to rule. There are no best poultry feeds or rations except those that supply the necessary food elements most economically. Hens cannot do well on a whole grain ration.—*Poultry, O. A. C.*

Above all else keep the hen houses clean and dry, and the fowls free from insect pests. If clean and dry with ample food, they can stand a great deal of cold, though in very extreme weather an ordinary lantern hung in the house will keep them in better condition.

Fowls should have their breakfast as soon as they leave the perches in the morning. To insure this, it is best to scatter the grain in the litter the night before, after they have gone to roost.

A hundred and fifty hens of the right strain and breed and under proper care, can be made to produce from \$900 to \$1,500 per year. That would be a fair profit for an acre of apples to show.

To produce fertile eggs for setting, better results are obtained by mating cockerels to hens and older birds to pullets.

Provide your hens with sprouted oats, one of the necessities for insuring winter eggs. A grain sprouter can be purchased at moderate cost and will soon pay for itself in healthier, more contented hens, and consequently greater egg production.

Now is the time, while you have time, to get out the nail kegs or boxes you will use for the setting hens and give them a thorough coating of whitewash that they may be ready for the first hen that shows symptoms of being broody.

Remember that scratch feed alone is not sufficient to produce eggs in the greatest numbers. Keep your laying stock indoors where they are warm and dry, and see that they have plenty of dry mash to go to at all times.

Do not overlook the grit, oyster shell and charcoal. They are all absolutely necessary to egg production.

Examine the birds, roosts and nests for the tiny, though voracious, red spider. There is no pest which will pull the hens down more than this. Look for it particularly under the wings. Carbolineum or similar substance should be used freely in case of infestation.

Two-by-four's make better perches than round poles. They should be placed with the 4-inch surface uppermost, as hens rest, not on their legs, but on their breast bones, which will not become crooked when resting upon this wider surface.

Just as important as selected, true-to-name nursery stock, are eggs or baby chicks from proven laying strains. Do not keep a flock of scrub boarders, but get good stock and they will amply repay you.

There is 75 per cent water in the egg. At the price of eggs, we wonder if the 75 per cent is not something else.

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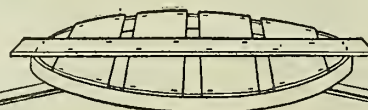
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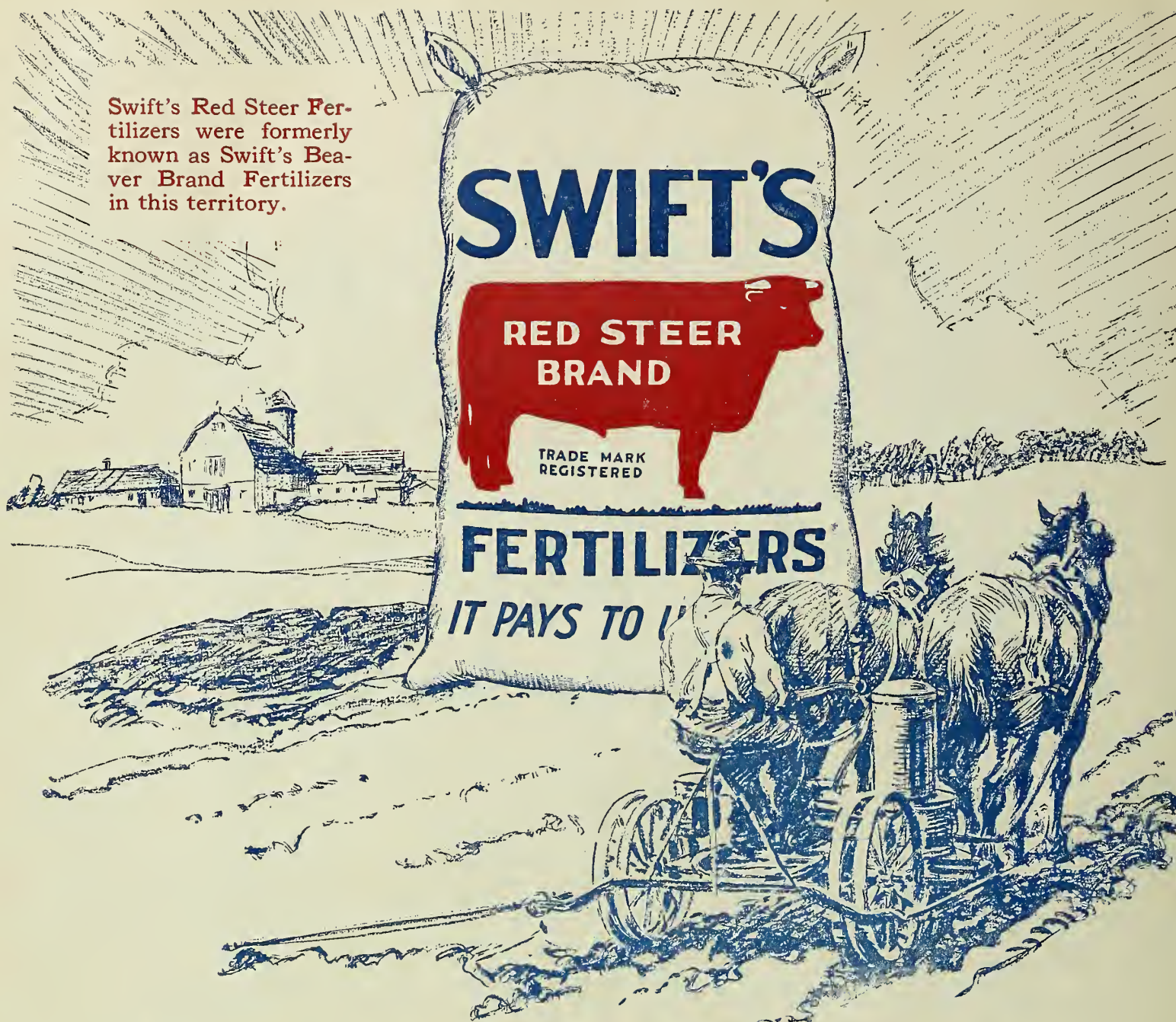
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